

39

RECORD

J. R. Fosberg

1 Xerox copy

pages 65 and 80

J. R. Fosberg

COLLECTOR'S AND FIELD NO. BOOK
(1950-51) 44-101

DATE
1951-52
1952-53
1953-54

PLANT SPECIES
.....
.....
.....

LOCAL NAME
.....
.....
.....

Collection and Field Note Book

No. 39

(Feb. 5, 1954 - Aug. 6, 1954)

(35677 - 35991)

JAPAN

O-shima Island, Izu Island (s. of Tokyo Bay)

Japan

Trail above Nomashi

Lowlands between Motomuna and Okada

Trail above Nomashi on north slopes of volcano

Mihara Yama cone ,,,,,, 35688-35691 ...

Midway Island near Airfield. 35692-35705 ...

General vegetation

CALIFORNIA

Altamont Pass Hills, Turlock Farm, Kings

River near Hub(s. of Fresno), Santa Ynez

Mts.....

KANSAS

Lawrence University of Kansas

VIRGINIA

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Williamsburg..... 35706-35711 ...

Alexandria, s. of Shirley Hwy 35713

Fauquier County, e. of Markham

..... 35714-35718 ...

Shenandoa Nat.'l Park, Dickey Hill

..... 35719-35720 ...

Big Meadows, Franklin Cliffs, Fisher Gap

..... 35721-35736 ...

Appalachian Trail s. of Fisher Gap

..... 35737-35740 ...

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* * *

J. R. Fosberg
Collection and
Field note book
39 # 35677-35992



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1954

Japan

1

3

Feb. 5 - Oshima Island,
Izu Is. (S. of Tokyo Bay)

The island is about 7 miles long, elliptical, with a large caldera in the north half. In this caldera is an active central cone. Lava flows of 1878, 1950 and 1951 cover much of the caldera floor. Drifting ash of about ^{fine} sand size covers part of the floor and drifts over some of the lava flows.

The ports Okada and Motomura are on east and north sides respectively, with a small fishing village, Nomaki, south of Motomura.

Road climbs around the mountain slope, zigzagging some, up to tea-house on caldera rim.

Along this road the ~~lower~~ forest is mostly cleared. The lower slopes are clothed by a dense brake of *Arundinaria* (a *hara*) 2-3 m. tall, very slender, (about the habit of American *Arundinaria*). Some of this

area is in cultivated fields, these separated by hedges of *Arundinaria*.

Above the bamboo the slopes become bushy, part of the brush being evergreen scrub-forests of *Camellia japonica* 3-5 m. tall, now in flower with pink single flowers. The trees are twisted and gnarled.

Most of the scrub is deciduous, the principal plants being species of *Alnus* (*A. firma*), *Prunus*, *Hydrangea*, and *Weigela* (*W. koraiensis*). There are scattered evergreens - *Camellia*, *Cryptomeria*, *Quercus*, *Podocarpus*, *Elaeagnus*, *Rhododendron*, *Ilex crenata*, and *Lauraceae*. This is growing on bedded black and yellow-brown ash. *Dioscorea* is common twining in scrub. The entire area has evidently been cut over repeatedly, more actively in last 2-3 years.

Deciduous patches and evergreen are rather separate below, but

with some intergradation. Upward, near caldera rim evergreen becomes more abundant till, first a mixed scrub, then an evergreen scrub become fairly general near the rim.

The floor of the caldera and the active cone have little vegetation. The 1950 and 1951 flows are bare, rough lava, with no vegetation, but with ~~some~~ ^{great areas of} wind-blown ash and cinders with scattered wind-polished pebbles and cobbles of a dense gray rock.

A kipuka of 1778 lava with depressions filled with new ash. patches of rock between these sandblasted. On this surfaces are patches of *Polygonum* sp. and hummocks of *Carex* sp. (perhaps also *Miscanthus sinensis*, which looks same - both are present acc. H. Hara). These plants collect ash.

The caldera rim has

a mosaic of patches of mixed scrub and *Miscanthus sinensis*.

Ravens are common in the caldera.

On the outer slopes on the trail down to Nomashi are patches of small trees of *Camellia japonica* with little else, little undergrowth. These seem probably not planted but probably so favored by removal of other plants ~~so~~ that they are now dominant.

The *Camellia* nuts are harvested for oil which is used as a hair-dressing and in cooking. This is a specialty of Oshima.

Several years ago, acc. Helen Foster, sparse forest of small *Cryptomeria* was common on these outer slopes. Now the trees have mostly been removed. There was a shrub layer between the trees. This is now dominant except where it has been clean cut for charcoal.

Here it is coming back vigorously.

Feb. 6 - Trail above Nomashi
Arundinaria only at low altitudes.

Hedera sp. common along trail at top of cliff.
Woods of *Camellia*, *Cryptomeria*, *Pittosporum*, *Podocarpus*, *Lithocarpus*?, *Pinus*.

Camellia forest of small trees, 5-6 m. tall, 10-12 cm. diam., smooth, bark gray brown; canopy not dense but practically complete. Little undergrowth except second story of small shrubs - *Ligustrum*, tree seedlings 0.5-0.8 m. tall, *Ribes*, *Hydrangea japonica*?, *Corylus*?, and a dense ground cover of *Carex*, *Andisia*, *Athyrium*, some broad-leaved herbs, *Botrychium* rare.

In ravines more ferns, especially a large *Dryopteris*, other plants except *Carex* less common. *Carex* in flower. *Hedera* common but not forming a great part of ground cover.

The upper band of evergreen scrub around the caldera rim is definitely discontinuous here, interrupted by lobes of deciduous scrub.

Feb. 6 - Caldera floor

The surface of the 1778 lava flow is as described on p. 3, with *Polygonum*, *Carex* and possibly sterile *Miscanthus*. Depressions filled with wind-blown ash, for $\frac{3}{4}$ the way n.e. from the cone to the rim of the caldera.

Then a few very depressed bushes of *Alnus firma*, a few bushes of *Ilex crenata* and a few tufts of fertile *Miscanthus sinensis* appear on hummocks and ridges in the pahoehoe lava. The flats are covered by drifted ash with small scab-like lava protrusions.

Clumps of scrub, principally *Alnus* and *Ilex* become more abundant and larger nearer the rim of the caldera. Here appear dunes of sand-like ash

held by bushes, and ash ridges parallel to rim.

Rim is There are in places densely covered by scrub. The slopes of the rim, also, are covered by scrub except where they are of loose drifted ash, blown against the lower part of the cliff.

Feb. 6 - Lowlands bet.

Motomura and Okada. A flat of gray ash soil. Mostly cultivated, cut into a checkerboard pattern of fields separated by hedges of *Arundinaria* and rows of trees - *Pinus*, *Cryptomeria*, and some deciduous trees.

Lower slopes and bluffs above Okada Harbor are covered by a mixture of *Arundinaria*, deciduous shrubs, a few evergreen shrubs, *Camellia* and a few conifers.

Feb. 5 - Trail above
Nomashie on north
slopes of volcano
in mixed scrub

35677 ~~Ceanothus~~ Neolitsea sericea (Bl.)
"Widy"
common

7 78 ~~Ceanothus~~ Neolitsea sericea
common

3 79 Gleichenia japonica
occasional on steep banks

in predominantly evergreen
scrub

3 80 Rhododendron
occasional

3 81 ~~Forsteria~~ Weigela kotoensis
common

7 82 Alnus firma
commonest shrub, locally
dominant

3 83 Camellia japonica
locally dominant

4 84 Elaeagnus
occasional

Feb. 6 - same

1 85 Ardisia humilis
common ground cover

1 86 Botrychium
rare in Camellia forest on ridge

2 87 Eurya japonica
common in mixed scrub.

300 m. (est.)

shrub, leaves white
beneath. "kusadami"
leaves white
"kusadami"

m. tall

Tall.

m. tall

all flowers
"tubaki" oil
from seed used
dressing and
one of local specialtie
erdent shrub.

"gumi"

300 m. depressed shrub; fruit
scarlet.

300 m.

400 m. bush 2 m. tall; buds black.

Oshima

Ohada (N)

Motomura (W.)

~~Mabuchi~~

Nomachi (W)

Mihara Yama
(volcano)

Feb. 5 - Trail above
Nomashie on north
slopes of volcano.
in mixed scrub

35677 ~~Cinnamomum~~ Neolitsea sericea (Bl.)
Koidz.
common

7 78 ~~Cinnamomum~~ Neolitsea sericea
common

3 79 Gleichenia japonica
occasional on steep banks

in predominantly evergreen
scrub

3 80 Rhododendron
occasional

3 81 ~~Forsteria~~ Weigela kotoensis
common

7 82 Alnus firma
commonest shrub, locally

3 83 dominant
Camellia japonica
locally dominant

4 84 Elaeagnus
occasional

Feb. 6 - same

1 85 Camellia forest and mixed scrub
Ardisia humilis
common ground cover

1 86 Botrychium
rare in Camellia forest on ridge

3 87 Eurya japonica
common in mixed scrub.

300 m. (est.)

shrub, leaves white
beneath. "kusadami"
shrub, leaves white
beneath. "kusadami"
"orajido"

550 m. (est.)

shrub 2 m. tall
"tsuji"
shrub 2 m. tall

shrub 2-3 m. tall
"yasha"

small tree, flowers
crimson. "tubaki", oil
pressed from seeds used
for hair-dressing and
cooking. One of local specialties.
semi-scandent shrub.
"gumi"

300 m. depressed shrub; fruit
scarlet.

300 m.

400 m. bush 2 m. tall; buds black.

1954 Japan

Feb. 6 - Mihara yama cone.
on surface of 1772 lava
flow, partly covered by
loose volcanic ash.

35688

89

90

91

Izu Is. Oshima I.

550m.

Feb. 13 - near airfield.
coral sand soil.

35692

on flat open ground
93 *Morus*

one plant seen in scrub.

94 *Schinus terebinthifolius*
one bush in scrub.

95 *Digitaria*
rare in open weedy
ground.

96 *Verbesina encelioides*
locally abundant
in open weedy ground.

97 *Lonchocarpus oleraceus* L.
uncommon around
buildings.

98 *Solanum nigrum* L.
occasional along roads.

99 *Lobularia maritima*
abundant in open ground.

35700 *Pluchea odorata*
common around air strip
and building.

01 *Croton bonariensis*
abundant in open ground.

02 *Bidens pilosa*
common in weedy ground.

03 *Medicago lupulina* L.
planted as lawn, escaping.

04 *Malvastrum coromandelianum* (L.) Gaertn.
around buildings 2"

05 *Graphalium purpureum*
rare around buildings.

shrub 1.5 m. tall, almost
leafless
sterile, very chlorotic.

aromatic; rays
yellow.

flowers white.

flowers white, very
fragrant.

~~up to 1.5 m. tall.~~
shrub 2 m. tall.

up to 1.5 m. tall.

flowers yellow.

(L.) Gaertn.

2 m.

The general vegetation is a scrub 2-3 m. high of *Scaevola*, collecting sand. This forms an understory in places to an uneven forest of *Casuarina*. The openings are covered by *Heterotaphrum*, *Lobularia*, *Verbesina*, etc.

Flora observed:

- a *Casuarina equisetifolia*
- a *Scaevola frutescens*
- la *Verbesina encelioides*
- la *Heterotaphrum secundatum*
- la *Cynodon dactylon*
- lc *Euphorbia heterophylla*
- a *Cyperus alternifolius*
- a *Ricinus communis*
- Crinum* sp. (cult.)
- Musa* sp. (cult.)
- Coccoloba uvifera*
- Terminalia catappa*
- la *Conyza bonariensis*
- c *Pluchea odorata*
- la *Lobularia maritima*
- la *Medicago lupulina* (cult. & ex.)
- Euphorbia hirta*
- Eleusine indica*
- lo *Sorbus oleracea*
- Chloris inflata*
- Vitex trifolia*
- Cenchrus echinatus*

- Portulaca oleracea*
- Boerhaavia diffusa*
- Eragrostis amabilis*
- o *Solanum nigrum*
- a *Digitaria*
- a *Morus*
- a *Schinus terebinthifolius*
- Messerschmidia argentea*
- o *Bidens pilosa*
- lo *Malvastrum coromandelianum*
- a *Gnaphalium purpureum*

Feb. 22 Altamont Pass
Hills badly overgrazed,
green but grass very
short, large areas
eaten clean.

Feb. 22-23 - Turlock
Farm - Marion has
plowed up the 4 acres
behind the barn which
has for 3 years been
in pasture. Badly
infested with bermuda
grass (*Cynodon dactylon*).
Will rake this up, and
burn it. Then subsoil
the piece and plow it
again. Will plant
watermelons.

The check of alfalfa
just east of this, now
being pastured, seems
to be largely bermuda
grass. Marion thinks
alfalfa will be OK there
for another year.

Feb. 23 - Kings River
near Hub (S. of Fresno)
River bed sandy, dry
except for large pools.
Salix sp. common along
bank, heavily infested
with *Phoradendron*.

On flat ground nearby
in small spots not
cultivated *Capsella*
bursa-pastoris, *Armsinkia*
sp. and *Plagiobothrys* sp.
are in flower.

Feb. 25 - Santa Ynez Mts.
grade back of Santa
Barbara to La Cumbre
at about 2500' *Leavenworthia*
megacarpa, in full
bloom, is dominant
in chaparral, with
adenostoma fasciculatum
etc. Higher up this
disappears, is replaced
by *C. crassifolia* and
the chaparral becomes
more mixed. At
La Cumbre, 4000' the
chaparral is made up
of *Arctostaphylos*,
Lithocarpus, *quercus*,
much *Adenostoma* etc.
A few pines here, some
planted, *P. coulteri*
native but scarce.

Along this crest
the ordinary coastal
woodland trees, such
as *Arbutus*, seem to
be dwarfed.

March 2 - Lawrence
University of Kansas
Natural History Reservation

Bottom-land ~~seem~~
fairly old second-growth
forest of

Quercus muhlenbergii
Q. macrocarpa
Q. stellata
Ulmus
some *Platanus occidentalis*
Celtis occidentalis
Gleditsia triacanthos
Acer saccharinum
Acer negundo
several *Carya* species
with *Cornus drummondii*
C. sericea in colonies
Vitis vulpina

This is a deep black
soil, 2-3 m. deep
cut by a system of
sharp V ravines.
Apparently was at
one time grassland,
judging from the soil.

The *Quercus muhlenbergii*
population displays a
remarkable leaf variation
from typical lanceolate to
broadly obovate, almost
"ob-deltoid".

The *Cornus sericea*,
abundant here, is
arborescent in habit, up
to 4 m. tall, with definite
trunks up to 3 cm. diam.

This bottom is
cut into a flat
prairie, down through
two series of beds of
hard limestone.
On top of the upper
bed was formerly
2-3 m. of soil, the upper
layers black, the
lower yellow-brown
or red-brown, very
fine. In the reserve
the edge of the
ravine is gullied
and sheet eroded
down so that most
of the black soil is
gone, many areas
now rolling bare
brown soil with grass.
Much of this planted.
Andropogon saccharoides,
A. scoparius, *Panicum*
virgatum, *Sorghastrum*
nuttallii, *Bouteloua curtipendula* all have
been planted here.
Unplanted parts covered by

aristida spp.

A part of this flat
covered by older woods
of *Quercus* and *Ulmus*
with undergrowth
of *Corylus* and *Lymnaea*
The prairie fields
are being invaded by
Malus ioensis, *Fraxinus*
lanceolata, *Ulmus*,
Rhus, *Lymnaea*,
etc.

1954 Virginia

March 28 - Annandale Road
near Columbia Pike

Annandale

Stand of *Pinus virginiana*
averaging 4-5 m. apart.
20-25 m. tall, cover not
very dense. Secondstory of *Cornus florida*,
Fagus grandifolia, etc.

Ground layer -

c *Mitchella repens*c *Vaccinium vacillans*lc *Chimaphila maculata*o *Smilax glauca*o *Goodyera pubescens*o *Rubus* (dewberry)lo *Antennaria plantaginifolia*r-o *Polytrichum acrostichoides*r-l *Lycopodium complanatum*scattered mats of *Polytrichum commune*.

Fairfax Co.

Labels typed
24

April 24 - Williamsburg
Deciduous woods with
some pine (*P. taeda*); open
beneath with few shrubs,
rich herbaceous layer
with abundant
Polystichum acrostichoides.
Many other species.

35706 *Obolaria virginica*
small colony on
road embankment.

11 08 *Stewartia ovata* (Cav.) Wendl.
common on edges of
bluffs along river.

11 07 *Valerianella radiata* (L.) DuRoi.
occasional on road embankment

11 09 *Kolkwitzia amabilis* Gracbr.
~~from~~ cultivated in greenhouse

2 J 10 April 25 south of Williamsburg
Camelina
weed in cultivated field.

April 25 - north shore of
Chickahominy River just
above confluence with James River

1 J 11 *Krigia*
weed in open ground

Apr. 25 Williamsburg

12 12 *Emilia*
cultivated in greenhouse.

Remarks

leaves purplish green,
flowers white.

shrub 2 m. tall.

flowers white.

leaves fairly firm,
flowers exceeding
involucre, whitish with
deep pink tips.

erect; flowers pale yellow.

flowers orange-yellow;
leaves pale green, glaucous.

No.

det. F. R. Fosberg

Labels typed
24

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involucre, whitish with
deep pink tips.

erect; flowers pale yellow.

flowers orange-yellow;
leaves pale green, glaucous.

not checked

26

labels typed

XX

1954 Virginia

May 23 - south of Shirley
Highway, east of Seminary Rd.

Old field with *Solidago*

Rubus, *Fraxinea*, grasses, etc.

35713

41

Oenothera perennis L.

small colony

Alexandria

27

flowers with calyx
carmine-maroon; petals
bright yellow, tips of
inflorescence pendent.

June 12 - 4 miles east of
Markham

weedy road cut

635714 *Papaver dubium* L.

common along road

235715 *Plantago aristata* Michx.
common

435716 *Verbena simplex* Schreb.
common

135717 *Cyperus*
rare

435718 *Bromus*
abundant

The poppy is common
for about 15 miles east
of Markham, and
rarely for a mile or
two west of it.

From well east of
Markham to the
Front Royal the *Platanus*
occidentalis seems to
be seriously defoliated
only the youngest tips
being still green.

erect, flowers scarlet,
stamens black.

erect, flowers blue-lavender.

~~at~~ panicles drooping.

30

1954

Virginia

Label typed
OK

35719
11

June 12 - Dickey Hill

Papaver dubium L.

rare along weedy roadside

June 12 - Jeremy Run

Galium mollugo L.

common along open roadside, banks and cuts

Isatis tinctoria common the length of the Northern section, only occasional or local in Central section. apparently two crops - about equal numbers in almost ripe fruit and in flower, none seen intermediate

Shenandoah Nat. Park 31

~~petals~~ petals scarlet, stamens black.

procumbent, many long stems from root crown, forming patches 1-2 m. across.

Robinia becoming more and more abundant along roadside.

not checked

32

1954 Virginia

labels typed

HK

June 12 - Big Meadows
meadow with abundant
bushes and small trees.

35721

Lycopodium tristachyum

occasional small colonies

5 4/22

Rhododendron roseum (Vaisel.) Rehd.

single plant in

4 5/23

Viburnum acerifolium L.
occasional in

5 4/24

Potentilla simplex
local in low shaded
spots in

3 4/25

Fragaria virginiana L.
abundant in

4 4/26

Oenothera fruticosa L. (var. *linearis*?)
common locally on ^{open} slopes in

Vaccinium stamineum very
common in meadow and
in full bloom.

Kalmia latifolia common
in woods and less so in
meadow, some bushes only
in bud, others in almost
full flower.

Shenandoah Nat. Park 33

rhizome buried except
at tips

shrub 1.5 m. tall;
flowers rose-purple
with red tube, deliciously
fragrant (like ~~coronation~~
pinkies).

shrub 1.8 m. tall; flowers
white, pinkish or purplish

ing, arching,
yellow,
argente
in open,
shade;
icy, achenes
its
it yellow,
day.

adows to
the slopes
a young
ula *populifolia*
isher gap

is a fine grove of hemlock
with a thick layer of
needles and twigs with
little herbaceous growth.
In ant-hills, large ones several
feet across, *Poa compressa* common in first.

PLANTS OF VIRGINIA

SHENANDOAH NATIONAL PARK

BLUE RIDGE MOUNTAINS

Loc. BIG MEADOWS

(4 mi. s. e. of Marksville,)

MADISON Co.

Habitat extensive meadow,
 with scattered bushes and trees

Date / /19

Coll. F. R. Fosberg

No.

Det.

Alt.

m.

Remarks

1994 Virginia

June 12 - Big Meadows
meadow with abundant
bushes and small trees.35721
2/21*Lycopodium tristachyum*

occasional small colonies

5 1/22

Rhododendron roseum (Loisel.) Rehd.
single plant in

6 5/23

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common in meadow and
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in woods and less so in
meadow, some bushes only
in bud, others in almost
full flower.rhizome buried except
at tips.shrub 1.5 m. tall,
flowers rose-purple
with red tube, deliciously
fragrant (like ~~coronation~~
pinkies).shrub 1.3 m. tall; flowers
white, pinkish or purplish
without.stems ascending, arching;
petals bright yellow,
slightly emarginate.small plants in open,
larger ones in shade;
fruit ^{usually moist} red, juicy, achenes
sunken in pits.flowers bright yellow,
open during day.From Big Meadows to
Fisher Gap the slopes
are covered by a young
growth of *Betula populifolia*.
Just before Fisher Gap
is a fine grove of hemlock
with a thick layer of
needles and twigs with
little herbaceous growth.In ant-hills, large ones several
feet across, *Poa compressa* common in first.

nos checked
34
labels typed
1954

Virginia

June 13 - Franklin Cliffs
Dry rocks and weedy
places.

35727 *Lepidium campestre* (L.) R. Br.
rare, weedy ~~place~~ ^{parking} overlook

4 31 28 *Bromus tectorum* L.
locally common in weedy
spot around parking
overlook

4 41 29 *Bromus ~~japonicus~~ f. ~~leucostachys~~*
locally common in
weedy places around parking
overlook

1 11 30 *Silene caroliniana* v.
penaylvania (Mx. Fern.)
in shaded rock crevices

3 31 31 *Rumex crispus* L.
steep weedy rocky road
embankment

June 13 - Fisher Gap
Grassy roadsides

3 31 32 *Poa*
dominant near road

5 41 33 *Lophastrum nutans* (L.) Nash
abundant locally along
~~so~~ Skyline Drive

3 31 34 *Festuca*
common

2 31 35 *Dactylis glomerata* L.
occasional

2 41 36 *Festuca*
common

Shenandoah Nat. Park

35

erect, petals white.

erect, spikelets drooping,
purplish.

(Hort.) Fern. erect; spikelets green,
slightly compressed.

flower pale pink.

erect, leaves strongly
crisp.

caespitose

241
Calamagrostis

caespitose, erect.

caespitose

erect.

erect.

not checked
36

1954 Virginia

Palala typical
1954

June 13 - Appalachian Trail
south of Fisher Gap
wooded west slopes

35737
2 34

Dryopteris disjuncta
very rocky ground in
deciduous forest.

1 11 38

Orobancha uniflora
rare, edge of trail.

2 21 39

Lycopodium complanatum
openings on thinly
wooded slope

6 11 40

Viola canadensis L.
abundant in *Tsuga* grove
in deep shade.

Shenandoah Nat. Park 37

plant bronzy white,
flowers lavender
with lower side of tube yellow.
prostrate, rhizome
not deeply buried.

erect, flowers
white tinged with
purple, becoming
purple ~~in~~ in age.

June 26 - The area around Montreal is intensively cultivated, with rather little wood of any kind. The feature most impressive is the greenness. This is such as to indicate a very wet climate, at least at this season.

England (from air)

June 27 - The coast of Cornwall, from the air, seems not to have any chalk cliffs. What rocks there are are dark, and the sand is brown. The country is intensively cultivated with the fields separated by hedgerows of bushes and low trees with fairly numerous taller trees scattered along them.

The fields are largely green, but a green showing the ground through it in many cases. Many fields plowed.

June 27 - Normandy is intensively cultivated, with but a few small patches of woods. The fields are small and separated by hedgerows in which tall trees are not so conspicuous as those in Cornwall.

The fields are in about the same condition of greenness and cultivation as in Cornwall.

Trees are planted sparsely in many of the fields but not as closely as in an ordinary orchard. Cultivation between them.

Nearer to Paris, to n.w. of Paris, the hedges disappear. The fields are separable principally by the pattern of cultivation, stages of development of crops, and different crops (grain, beets, mustard, etc.). Fields larger. Houses almost entirely grouped in villages. Patches of forest larger and more numerous, becoming ~~more~~ nearer Paris.

all day to
end of book

July 4 - Forêt de Fontainebleau -

Near Roche Eponge, 1-1.5 km. n.e. of Fontainebleau

Pine forest on sandstone hills, rather open
with some heather on sandstone outcrops.

Soil sandy but with a definite peaty layer.

3 35741

Amelanchier vulgaris Moench

In crevices on sandstone boulders.

42

Erica cinerea L.

Abundant in ^{relatively} open rocky places.

Hill tops with outcroppings of sandstone
~~weather~~ with angles weathered off into rounded
shapes with soil between them of white sand
covered with brown moss mixed with sand.

Mossy carpet where not too much trampled,
patches of heather general with scattered
shrubs of Juniper, young *Quercus robur*,
Castanea, etc. some tufts of *Deschampsia*
flexuosa; the rocks with abundant foliose
lichens & hypnoid mosses, some tufted
grimmioides mosses, the whole covered by an
open woodland of several species of pine and
Quercus robur, with scattered chestnuts.

Flat sandstone uplands with abundant
outcroppings have some *Pteridium aquilinum*,
Lonicera sp., scattered young birches, some
other grasses, *Crataegus* and other shrubs and
with the heather largely *Calluna*. *Polypodium*
vulgare on the rocks with *Thuidium* and
other mosses.

2

43

Polypodium vulgare L.

Common locally on mossy sandstone
boulders.

Slender straggling shrub, 1-2 m. long, ripe
- fruit dark blue.
- low shrub, 2-4 dm. tall, flowers magenta.

Rhizome bitter.

35744

Tilia sylvestris Desf.

2

On sandstone outcropping

3

1

45

Open beech and pine forest in sandy soil
Ruscus aculeatus L.

Isolated plant in shade

2

46

~~Besseyi~~ *Brachypodium pinnatum* Beauv.

(Erect small loose clumps)

Occasional
Maench.

1

47

Vincetoxicum officinale

Rare in open place

2

48

Common in open place.

2

49

Melica nutans L.

Occasional in open place

1

50

Ilex aquifolium L.

Rare in patch of pine

3

51

Melampyrum pratense L.

In open oak forest, common.

n.n.e. of

3 km from Fontainebleau, s. of Tour
Denecourt

2

52

Galium sylvestre Poll.

Roadside banks in mixed pine-oak forest.

1

53

Coronilla varia L.

Roadside banks in mixed pine-oak forest

1

54

Tenacium chamaedrys L.

Roadside banks in mixed pine-oak forest

2

55

Heptia nudicaulis Rich.

In pure young beech forest

Tree 10 m. tall.

Dwarf shrub 3 dm. tall, several stems
- from underground base.

Erect; flowers pale greenish-yellow.

Erect, tufted.

Dense tufts.

Small tree 3 m tall, fruit immature.

Flowers yellow, lip brighter yellow.

Flowers white

Flowers purplish-pink

Flowers rose-pink

Plants brownish.

July 9 - 2-4 km. n. of Fontainebleau, vicinity of Le Gros Fontaineau natural history reserve, in the Bois de Fontainebleau.

A low plateau of fine gray to gray-brown calcareous soil, with a very few scattered limestone rocks, surrounded by escarpments, low on the south side, higher on the north, rimmed by sandstone boulders and outcroppings. General level of the plateau 148-144 m., height of scarp 40-50 m., but not very abrupt.

The plateau surface covered by a fine forest of oak and beech, mixed, trees up to 20 or more m. tall, and with trees up to well over 1 m. diam. The proportions of oak and beech vary locally from almost all one to almost all of the other. This forest is generally rather open beneath, but with uneven undergrowth of *Ilex aquifolium* and beech ~~saplings~~ saplings 1-2(-3) m. high forming low thickets, alternating

with patches of *Ruscus*, patches of bracken, ^{of Rubus} and a more or less connected matrix of grass of several kinds, especially what appears to be a *Festuca* and of *Hedera helix*, which also tends to climb the trees. *Juniperus* is very occasional, also *Forbus latifolia*.

On the escarpments most of the oak drops out immediately, and locally heather appears. The general vegetation on the escarpment is beech forest with some pine, some birch (*Betula*), and undergrowth of *Ilex* and *Pteridium* and some *Juniperus* and *Forbus latifolia*.

Pinus sylvestris tends to invade openings, or rather, *Betula* occupies them first and *Pinus* invades shortly thereafter. The pine is removed in the reserve, as it is an introduced species. *Pteridium* is in large patches, either in the open or in the shade, seemingly irrespective of the kind of soil. ~~on sandy areas~~

July 9 - Fontainebleau Forest
between Vallee de La Solle
and Barbizon - general
information furnished
by forestry engineer in
charge of area, M. Daron.

On sandy areas the
succession is generally
Betula (open) → *Pinus sylvestris*
→ *Fagus sylvatica* (with
some *Quercus pubescens*).
The beech is especially
favored on bare sandstone.
Pinus laricina is often
grafted on *P. sylvestris*
stock, forming a large
tree but not regenerating
from seed here. Seed cones
produced but no seedlings,
(whether from lack of
germination or lack of
survival not clear),
failure suggested to be due
to highly siliceous soil.

Pine was introduced
here in 1780. It presents
a great fire hazard (fires
started principally by careless
tourists) and much of the
pine forest has been replaced
by beech and oak in the
last 100 years.

Of the oaks, *Q. robur* is
principal species on
calcareous soils. *Q. robur*
and *Q. petraea* are grown
on siliceous soils and
from a forestry standpoint
are considered, with their
hybrids, as identical.

These forests, except
in the natural history
and artistic reserves,
are very carefully managed.
The cycle of management
in oak forests is now
180 years and is to be
increased to at least 200
years, the trees reaching
55-60 cm. diam. In the
beech forest it is 120 years
with the trees reaching
45-50 cm. diam. For pine
it is 100 years, with the
trees reaching 45 cm. diam.
This is considered too long
and will be reduced to 90 or
even 80 years, which is
more normal for pine.

Beech is actually planted
under pine when latter is
30-40 years old.

A large open area present for some distance along road is ascribed to large fires set by the Germans in 1945. Large parts of this are covered by a scrub of *Urtica*, *scorpius* and oak and pine seedlings, with scattered small birch trees and a few small oaks. The pine will grow up fastest and form a forest. On better soils this will be replaced by hardwoods, but on very rocky sandstone terrain pine will be continued.

In 1720 there is said to have been an immense fire, set by people smoking out bees to get honey. The area has been repeatedly

July 9 - Mare aux Couleuvres,
Forêt de Fontainebleau, about 5 km.
n.w. of Fontainebleau

irregular surface of
exposed sandstone with little
soil, vegetation irregularly open.

35756

Quercus pubescens
locally common

7

burned over since, especially
in 1945

The area around Mare
aux Couleuvres is an irregular
surface of sandstone with
soil only in the depressions,
which frequently have no
outlets and are flooded after
rains and water stands till
it dries up. There is a
general cover of *Erica cinerea*
and *Calluna vulgaris* except
on bare tops of rocks and in
desiccated pools. Small
birches dominate the landscape,
with some small *Quercus pubescens*,
Sedum album, *Sedum* sp. (yellow fl.)
Hypericum perforatum and
many other species, some of
them rare and local
in this region, are found
here. *Pteridium* is abundant,
Populus tremula locally
common. Most of larger
Betula have bases of trunks
rough, thus probably
belonging to *B. verrucosa* series.

small tree about 8 m. tall.

- 95757 *Quercus pubescens*
 locally common
 58 *Agrostis alba* L. ?
 common in desiccating pools.
 59 *Hypericum humifusum* L.
 common in desiccating pools
 60 *Fumana vulgaris* Spach
 61 *Cornus sanguinea* L.
 rare
 62 *Ranunculus flammula* var. ?
 local in desiccating pools

small tree about 8 m. tall,
 10-12 cm. diam. acorns
 from ground beneath.

fruit red.

flowers yellow.
 shrub 1 m. tall, ~~the~~ cymes
 reddish, fruit green.
 decumbent, flowers
 bright yellow.

July 12. along Rt. Nat. 7
n.w. of Fontainebleau Forest

This area has large
grain fields - wheat,
oats, barley, rape (?) -
varying from almost
ripe to actually being
harvested.

July 12 - between Fontainebleau
and Montargis along
Rt. Nat. 7.

Generally small fields,
and patches of woods;
rows of trees, esp. *Populus*.
thickets of *Crataegus*,
Ligustrum, *Robinia* (young),
etc. some hedge-rows.

Viscum album seen
parasitizing *Populus*
and *Robinia*.

Miscellaneous cult-
ivation - grain, alfalfa,
beets, potatoes, vegetables,
even maize, on rolling
ground of chalk with
chest or flint nodules.
Fruit trees are scattered
in some fields.

Some west-facing chalk
slopes covered by close
scrub of *Juniperus*

communis. Some pine
and oaks also on chalk.
Certain of these west
slopes are grassy.

Robinia tends to
line roads.

A few very small
vineyards here.

July 14 Fontainebleau
weedy ground

35763 *Galium sylvestre* Poll.
shaded spots

64 *Senecio jacobaea* L.
common in sunny places

65 *Erigeron annuus*
abundant in sun and shade

July 14 1 km. n.e. Fontainebleau
in Forêt de Fontainebleau 100-140 m.
roadside in rather
open mixed forest of oak and pine.

66 *Teucrium scordonia* L.
common generally

67 *Carex glauca* Mun.?
local

68 *Quercus robur* L.
very common

69 *Myrsotis silvatica* Hoffm.
rare, between sandstone
rocks

70 *Euonymus europaeus* L.
rare in undergrowth

71 *Clematis vitalba* L.
occasional

72 *Rubus saxatilis* L.
common in open woods
on flat rocky ground.

procumbent; flowers
white.

erect from ~~erect~~ slender
subterranean rhizomes,
stems and under sides
of leaves purplish; flowers
deep yellow.
erect, rays white to
pale lavender, disk greenish yellow.

flowers pale yellowish,
odor strong. rhizome buried.
loose colony, rhizome
buried. fruits dull yellowish.
tree about 20 cm. diam.,
10 m. tall.
flowers pale blue

vine, extensively
climbing in trees; flowers
cream-white.
forming low tangles up
to 7-8 dm. tall; flowers
pale pink.

Above the city to the north east, between Avon, ~~and~~ Roche Eponge and Croix de Calvaine, the sandstone plateau is covered by a rather open and rather low forest of oak and pine, with some ~~sub~~ shrubs, patches of heather, large fine sandstone boulders, and locally a thick layer of peat on the ground. All oaks examined seemed closest to *Q. robur* L. (*Q. ped.*) but are probably hybrids with *Q. petraea*, as they have rather short peduncles. Leaf form is variable. The leaves are badly eaten by caterpillars which roll leaves up into a tube about the size of a cigaret in which they live. Ants pasture very large dark brown aphids on the twigs.

Locally large patches of *Pteridium* cover the ground under the oaks and pines.

July 17 - Bet. Nemours and Souppes sur Loing

General landscape is dominated by trees in rows and patches, ^{steep} slopes wooded, poplars on flats, fruit trees around houses.

More or less the same bet. Souppes and Montargis. Robinia very common along the roads, in edges of woods, etc.

South of Montargis the landscape becomes more open, dominated by grain, beet, alfalfa fields, etc., more level & gently rolling. Farther on, near Nogent sur Vernisson, trees become dominant again. Two methods of forest management to be seen here - clear cutting and leaving seed trees some yards apart.

South of Nogent heather and birch appear for a short distance. Said to extend commonly as far west as Orleans.

Castanea is common here, flowering very heavily, a few dead trees seen, perhaps first inroads of blight.

Just north of Briare is a large forest, mostly rather open. South of Briare vineyards become common. Also some poppy fields, ~~light orange~~ ^{light orange} flowered, raised for oil.

The Loire River, between Briare and Nevers, is broad and has a conspicuously braided channel full of sand bars and flats running through a broad flood plain with the higher land at its sides dissected into low rolling hills. The part of the flood plain nearest the river, especially on the west side, is occupied by a low irregular very thick brushy forest, principally of Salix and Populus, the latter making emergent trees from the general low story of willows and young populus. Sand bars of different ages are covered by brush of different sizes. Those nearest the main channel are mostly bare.

The rest of the flood plain is a mixture of cultivated land and marsh with scattered trees,

mostly Populus. Viscum very noticeable on the Populus.

The fields in this plain and on the low hills on the ~~west~~ east side are separated by hedgerows in which a Prunus is common, also various trees. Roads lined by rows of Platanus, Populus, etc. Fields very colorful with Papaver, Hypericum, Centaurea, cornilla, Ononis, etc. Vineyards very common on low hills at edge of flood plain. A special dry white wine made at Pouilly. The braided bed of the river very wide at La Charité, appearing as much as 1 km.

Above this, in the vicinity of Trzanges, and south in valley of R. Allier, to St. Pierre there are grain fields, pastures and some woodlots. The fields are separated by hedgerows. Much hay produced here.

South of St. Pierre is more or less the same the terrain gently rolling. Approaching Moulins hedges become a little less common.

July 18 - Between Moulins and Chatel de Neuvre hedges are really the rule. Mostly of Crataegus. South of Chatel de N. they

become scarce. Vineyards are abundant.

July 13 - Clermont-Ferrand.

Puy de Dôme is a volcanic remnant a cone 1465 m. high. It is mainly of a light gray rather hard rock, said to be extruded; at least no sign of a crater at top, though other cones in neighborhood have well-marked craters.

On gentler slopes just below steep part of mountain there is a thin vegetation of grasses, Lotus, Galium verum, etc. with shrubs and patches of Cytisus, Calluna, etc. In places Cytisus is almost continuous. Small forests of Betula, a few Quercus. Small plantation of young Pinus sylvestris and Picea on east side at perhaps 690 m. In openings Calluna, Digitalis purpurea, Pteridium, Achium, Achillea, Galium mollugo, Rubus, Centaurea, etc.

Pteridium is dominant over large areas.

At about 1050 m. ^{and above} Corylus is locally dominant in openings and in spruce forests, here only near opening, and road. Scabiosa, Brachypodium,

Valeriana seen along road. At 1100 m. and up to 1200 or 1250 m. ~~on~~

south side is a well developed spruce forest with ~~at~~ some Betula.

At 1160 m. some Fagus. In opening Myosotis, Cirsium, Epilobium, Trifolium pratense, T. repens. In the well-grown spruce forest, above 1160 m. there is only a poorly developed herbaceous layer - some Galium, Geranium robertianum, etc.

Mostly a moss cover only on ground. At upper altitudes around toward west side this forest is partly dead - from exposure to wind? It is lacking on west and north sides. Above it and on sides where it is lacking is ~~a~~ generally a meadow, colorful with flowers - Cytisus, Galium, Alchemilla, Stellaria, Viola, Achillea, Vicia, Polygonum bistortum, Phytolacca, Geranium, Silene, Ranunculus, etc. On west slope this is invadably a broad-leaved forbush (lvs. white beneath) forming scattered shrubs (m. tall).

On rock outcrops a mat of Cytisus and Calluna covers the peaty ground between the rocks.

~~§~~

July 18 - South of Clermont
Ferrand, over the first
ridge there is some spruce
forest, then open country
on a gritty soil either of
a decomposed granite or a
lapillate volcanic material.
Here are grasses, cytisus,
a few small junipers,
small patches of heather,
scattered pines and
birches. South of this
are meadows, hedges, patches
of thicket, birch woods,
coniferous woods, etc.

On lava flow, called
Cheire d'aydat, there ~~is~~ are
Calluna, various grasses,
Silene, Dianthus and various
other flowering herbs, *Paronychia*,
~~scattered~~ *Cytisus*, *Genista*
alata, scattered junipers,
Corylus, planted *Pinus*
and *Picea*. This flow
is said to be upper quaternary.
This flow dams the Veyre R.
forming Lake d'aydat.

South of the lake on the
slopes are fir forests, then an
irregular rolling upland
with meadows, patches
of *Cytisus*, ~~head~~ hedgerows
with *Sambucus* conspicuously
in flower - these hedgerows

mostly just pieces,
not enclosing anything.
The meadows have
many flowers out now.
They are both mowed
and pastured; some
grain is grown, not yet
nearly mature; some
coniferous plantations; both
sheep and cattle are pastured
here. This surface
seems largely made up
of old basalt flows (tertiary,
miocene?). Where a
broken off section of one
of these shows it is
conspicuously columnar
but the columns are badly
shattered. This is true across
the valley from Murols, where
such a section was examined
and rock asplenium collected.

To the south some snow
patches still persist
on the mountain slopes.

At Murols there is pine
forest and beech forest in
the canyon. The pines are,
some of them, very short needled
may be *P. cembra*. Up the canyon
of the *Course de Chambon* from
Murols is Lac Chambon (377m).
Here is a locality for beds
of "cinerite" and "diatomite" (see p. 80)

July 18 - La Cassiere, 11 km.
s.e. Clermont-Ferrand.

35773 *Rhinanthus* ^{slipping meadow} ~~*hirsutus* Lam.~~ ^{*electrocyphus* Pollich}
very common

74 *Luzula*

75 *Brija media* L.
occasional

76 *Scabiosa*
common

77 *Genista alata*
common

78 *Caryophyll.*
common

79 *Campanula*
occasional

80 *Myosotis*
occasional

July 18 - Cheire d'Aydat,
13 km. s.w. of Clermont-Ferrand
on rough lava-flow
with pines, ^{junipers} and other
~~conifers~~ and conifers.

81 *Veronica officinalis* L.
occasional

82 *Helianthemum*
common

83 *Jasione*
occasional

84 *Asperula cynanchica* L.
common

85 *Melampyrum*

825 m.

corollas bright yellow,
bracts pale green.

flowers bright ^{red} purple

flowers bright yellow.

flowers white.

flowers violet-blue

fls. deep lavender.

flowers bright yellow.

blue-lavender

flowers pinkish

bracts maroon, flowers
~~red~~ red with yellow lip.

- 35786 *Dianthus*
occasional
- 2 87 *Galium*
common
- 1 88 *Paronychia*
occasional
- 1 89 *Cystopteris fragilis*
uncommon
- 1 90 *Campanula*
occasional
- 1 91 *Valeriana officinalis* L.
common
- 1 92 *Lilene*
occasional

July 18 - north of Murels
22 km. S.S.W. of Clermont-Ferrand
in crevices of old
shattered basalt flow

- 2 93 *Asplenium trichomanes* L.
common
- 2 94 *Asplenium germanicum* Wein.
common
- 2 95 *Asplenium ruta-muraria* L.
common
- 1 96 *Gnaphalium*
occasional
- 2 97 *Helleborus foetidus* L.
common at foot of cliffs

flowers ~~deep rose~~
bright crimson - pink.
flowers white
flowers whitish.

flowers ~~bluish~~
violet-blue.
flowers pinkish white
fls. white.

900 m

erect.

July 19 - Bessolles

meadow on basaltic soil

35798

Viola

very common

~~99 Viola~~~~occasional~~

1

99 Viola

occasional

35800

Malva

common

same

on steep road cut

3

01 Digitalis lutea

common

July 19 - east side of Lac Pavin

2

02 Orchis

scattered in woods and meadows, uncommon

2

03 Arnica

occasional in meadow, with some heather

1

04 Galium

in meadow with heather

1

05 Neottia nictitans-avis

rare in mixed woods, mainly beech.

3

06 Anemone

common in sloping meadow

1000 m.?

flowers very dark purple with yellow spot on lower petal.

flowers dark purple with lower petal pale, marked with dark.

flowers rose-purple.

flowers pale yellow.

1225 m.

roots fleshy; petals greenish, sepals white, spur green.

flowers orange-yellow.

flowers white.

flowers dull light brown.

flowers whitish, marked inside with green, outside with purple.

35807 *Ranunculus*

common in meadow

2 08 *Vaccinium myrtillus*
common in meadow
with heather (also in
forest)

29

July 19 - Slopes of Puy de Montchal
above Lac Pavin.

1 09 ~~*Asagala*~~? *Ajuga genevensis*!
common in *Picea* forest

2 10 *Anemone*
occasional in *Picea* forest

1 11 *Maianthemum bifolium* (L.) Schum.
common in dense ^{*Picea*} forest

3 12 *Lamium galicobdolon*
occasional in forest

July 19 - west side of
Lac Pavin
in beech forest

1 13 *Dryopteris phlegopteris*
on rocks above trail

3 14 *Dryopteris linneana*
common on steep slopes
and rocky places.

2 15 *Geranium*
common on steep slopes

2 16 *Lychnis floz-jovis*
common along trail

2 17 *Luzula*
common on steep rocky slopes

3 18 *Epilobium montanum*
common along trail

flowers deep yellow.

low patches; fruits
immature.

flowers blue

flowers clear white.

flowers white.

flowers yellow,
~~the~~ lower lip marked
with red-brown.

1200-1220 m.

rhizome shallowly buried,
creeping, prostrate light green.

flowers deep magenta

flowers crimson

small tufts

flowers rose.

- 35819 *Lysimachia nemorum*
common along trail
- 20 *Phyteuma spicatum* L.
common on lower slopes
above lake

see
7-24 at top

July 19 - Top of Puy de Montchal,
south of Lac Pavin.

open heath with *Juniperus*,
Vaccinium and *Calluna*

- 21 *Polygonatum verticillatum*
common locally
- 22 *Vaccinium uliginosum*
common locally
- 23 *Stellaria palustris*
occasional
- 24 *Paris quadrifolia*
rare along trail
- 25 *Galium*
common

July 19 - just below Lac Pavin
~~road~~ ^{open} inverted ravine
road bank

- 26 *Linaria striatula*
road bank
- 27 *Orchis conopsea* L.
rare in moist spot
- 28 *Orchis maculata* (?)
occasional, moist spots

prostrate, flowers
yellow.
root thickened, sap
milky; flowers white.

1411 m.

erect, ~~roots~~ rhizome
deeply buried among
roots of shrubs.
forming ^{low} patches; leaves
bluish green.
flowers white

roots and rhizome
yellow; flowers
white.

1190 m.

flowers mauve with
darker stripes, palate
yellow.
flowers crimson

leaves spotted with
bronze; flowers lavender
with deep purple spots.

July 19 - bog, 1 km. n.e.
of Lac Chauvet
open bog with deep
peat, ~~standing~~ ^{moving} water
in lowest spots

- 35329 *Polygala*
slope above wet part of bog
2 30 *Polygonum bistortum*
common in wet peat
3 31 ~~*Eriophorum*~~ *Eriophorum*
common in wet peat
2 32 *Salix lapponica*?
occasional in wet peat
2 33 *Potentilla* (~~*complanata*~~) *palustris*
colony in flowing water
2 34 *Carex*?
common
3 35 *Galium constrictum*
common

wooded bog

- 1 36 *Oxalis maculata*
common in open places
1 37 *Galium*
common in open places
1 38 *Polygala amara*?
rare on peaty slope above
bog
3 39 *Euphrasia*
local on peaty slope
above bog
3 40 ~~in wet peat~~ *Pedicularis*
in wet peat

flowers bright deep purple.

erect, flowers pink

shrub 1 m. tall.

flowers maroon

densely caespitose

flowers white.

leaves spotted with brown,
flowers lavender, marked with purple.
flowers white.

flowers blue

flowers white, marked
with black inside; palato
yellow.

flowers crimson.

July 19 - valley between
Roche Trilliere and Roche Sanevoie,
above Rochefort-Montagne

35941 *Pyrola media*
steep bank above road

42 *Luzula*
steep bank above road

43 *Stellaria*
rare on roadside bank

44 *Polygala*
roadside bank, broken
rocks.

July 19 - Gannat, Dept. Allier
45 *Onobrychis viciifoliolus* Scop.
cultivated for forage

July 20 - Forêt de Bagnolet

46 *Galium palustre* L.
roadside ditch

north end of Forêt de Bagnolet
47 *Centaurium*
rare in edge of marsh

~~fl.~~ leaves light green;
flowers white, not
secund.

caespitose, flowers
white.
flowers white.

flowers bright blue.

flowers rose-purple

flowers bright pink.

of dated as at the base of the lower pliocene. The diatomite, especially, contains impressions of leaves and fruits, of which some were collected. *Fagus* is most common. The

outcrop has been almost completely destroyed to make a parking lot. (for reference to this see Boulay, Bull.

Hor. Geol. Fr. 21:97, 1893; Boulay, Flore pliocene du Mt. Dore, 1-116, Paris; de la Vaux, R., + Marty, P. Nouvelles recherches sur la flore fossile des environs de Varennes (Puy de Dore), Rev. Gen. Bot. 32:289, 1920; Jung, J., Geologie de l'Auvergne, 1-372, Paris, 1946 - here, p. 200, mentions 40 sp. plants and 50 insects, from which the beds are dated as base of lower pliocene above the La Banboule level, same level as the pumiceous alluvium of Ferestre. Very detailed geological map of region in 1/80,000 geological map of France, Clermont (146) and Brioude (175) sheets).

(Material sent to Washington via diplomatic pouch, courtesy of office of agr. att. at Paris Embassy, Dr. Hermann.)

Region between La Chambon and Bessolles - slopes wooded, valley flats cultivated. *Sambucus* very common and conspicuous in flower. Woods are mainly pine, some *Fraxinus excelsa*.

The pines may be *P. sylvestris*, though the leaves vary much in length and some may be *P. cembra*, etc.

Uplands around Bessolles are of same shattered basalt as on other side of mounds. Pastured, some areas covered by *Pteridium* and *Cytisus*. *Fraxinus* is common in hedgerows. More or less the same to Besse en Chaussee. (1050 m. Besse) Here there is a biological laboratory headed by M. Olivier - part of Université de Clermont.

The whole region is an exceedingly intricate complex of extrusive - basalt flows, basaltic tuffs, andesites, of Miocene to late quaternary age, lying on a basement of older crystalline rocks. There is a flora -

Herbaud-Joseph

Flore d'Auvergne, ed. 9
1-638, Paris, Tours, Clermont-Ferrand,
1915.

Southwest of Besse, along the Couze de Pavin, is pasture with patches of beech forest in U shaped valleys with rounded hills.

Lac Pavin is a beautiful little crater lake, 20 m. deep, water deep green, surrounded by steep crater wall wooded by forest of *Fagus*, with on n.e. side, at least, some *Salix* and some conifers, esp. pine. Sparse herbaceous undergrowth on ~~the~~ slopes where forest is thick, more varied and luxuriant where there are rocky places or openings.

Outer slope is pasture with prostrate *Juniperus* and many flowers. *Calluna* comes in in overgrazed spots, apparently.

On south side of lake, on slopes of Puy de Montchal, is spruce (*Picea*) forest of trees about 30 m. tall, trees about 3-4 dm. diam. 3-5 m. apart, lichen-covered, incompletely self-pruned - the branches dead and broken but still persistent. There is a thin herbaceous ground cover of scattered *Maidanthemum*

Trifolium and *Pteridium* sp. with a carpet of mosses.

Puy de Montchal itself, 1411 m. high, is a rounded peak mostly covered by spruce and beech forest, some larch, fir, etc.

mixed in, the openings either meadows with flowers and grass or heaths with prostrate *Juniperus*, *Vaccinium*, *Calluna*, *Rubus*, and many flowering herbs, e.g. *Potentilla tomentosa*, *Galium*

Silene
Pillularia
Stellaria

Gentiana lutea

Narcissus

Lactuca (?) (blue)

Rumex

Polygonatum verticillatum

several umbelliferous etc.

The peak itself is covered on top by such a heath.

The heath is thick. ^{off the lake}

On the west side the beech forest is magnificent with large trees, many ferns and shade-loving herbs, etc.

1197 m.

Bet. Lac Parin and Lac Chauvet are rolling high meadows boggy in places, with compact patches and clumps of beech forest, low patches of juniper and Corylus. *Gentiana alata* abundant in meadows. *Eriophorum* forming white patches in low spots, *Gentiana lutea* conspicuous with deep yellow flowers, forms large colonies.

Bogs near Lac Chauvet with deep peat, *Calluna* abundant, many sedge incl. *Eriophorum*. Some peat has been dug out locally. Standing and gently running water in lowest places.

West of Lake Chauvet the rolling meadowland is extremely rich in flowers. Basalt outcrops have *Pteridium*, broom, etc. Knobs of columnar basalt, patches of woods and brush esp. along streams, some scattered trees.

Above Laboumboule and to Mont Dore are rather extensive shrub forests

with patches of meadow. North of Mont Dore are fir forests. Beyond this are three large rocks of columnar Trachyte-phonolite, columns slender, surrounded by beech forest. Valley bet. Roche Trilliere and Roche Sanadoire is glaciated. From there through Rochefort-Montagne the road rapidly descends out of the high plateau.

In the valley are meadows and broken patches of beech woods.

July 20 Forêt de Bagnot,
n. of Moulins

Part examined are
young forest.

One place mainly
oak, some beech, trees
5-10 cm thick, perhaps
10 m. tall, 1-2 m apart.

There are ~~also~~ a few
Populus tremula.

Thin undergrowth of
tree seedlings ~~and~~ here
and there, local thickets
of *Rubus* with various
~~fr~~ prickles, not dense, though.

Patches of *Pteridium*,
spots of *Polytrichum*
and other mosses.

Tufts of sterile *Deschampsia*,
a little *Hedera*, *Convallaria*
common locally, scattered
Viola, *Mercurialis*,

Lonicera. Mainly a
layer of dry leaves.

Some fleshy fungi,
mostly *Lactaria*.

Another place -
forest about same size,
predominantly beech.

More *Hedera* but otherwise
much less herbaceous
ground cover. Very little
Deschampsia, some
Polytrichum.

North of this forest
is a marshy
area ~~at~~ along a
small streamlet.

Some *Sphagnum*.
Badly grazed. *Osmunda*,
regalis fairly common.
Rubus thickets, very
hard to penetrate.

Possible to walk in
marsh now, as
there has been dry
weather for a time.
Very little standing
water.

s. of
Champs

July 25 - out of Paris to south - generally partly wooded, especially on slopes, partly cultivated. To north and south of Thionville and Monnerville are vast open fields, mostly of grain being harvested. Some sugar beets. A very few rows of trees and patches of woods.

At Angerville trees become somewhat more evident but still the landscape is one of open wheat fields. Some alfalfa and beets.

More common toward Toury and southward, but still dominantly grain fields. Around Chevilly the landscape becomes largely wooded but the woods are rather scrubby - young second growth with scattered seed trees. Still some large open fields ground covered. At Laran are plantations of *Pinus sylvestris*. Little or no wheat here to Orleans, openings pastured, a weedy, or orchards.

edges of
Forest
of Orleans

Just s. of ~~Paris~~ Orleans the first few vineyard. Miscellaneous cultivation and some woods. Roadside and banks and waste spot covered by young Robinia, forming thickets. South a little way forest becomes more general, some heather. Mostly oak, but birch common. Forest mostly scrubby, patches of *Cytisus* and of pines common. Some ponds, some areas of open fields. Southward some patches of very good looking forest. also much that is mixed and irregular. Soil light gray. Pines more and more abundant, also birches and heather. Ponds and marshes more common, with *Nymphaea* and *Typha*, *Scirpus lacustris*. Large patches of *Pteridium*, esp. around Vouzou. South of this, *Castanea* appears in considerable numbers. South of this broken woods but s.s. lined with thickets of Robinia. to Lamotte-Beuvron and southward. More pine

birch and heather. Pale gray soil continues. Hoven ~~et~~ le Fuselier - fields separated by hedgerows and woodlots. Pines, oaks, birch, etc. Some rows of poplar, very noticeably infected with Viscum. Birch seems generally an early stage. Pines where dominant have open heather beneath them. Some open heaths. Large uneven stands of birch esp. near Lalbis. Some birch wood piled up for fuel. More or less similar landscape southward, heather more abundant, to Thiellay. South of here somewhat more cultivation. Fields separated by hedgerows.

Forêt de Vierzon - tall oaks, some areas of scrubby birch, ponds.

South of Vierzon considerable cultivation, fields sometimes separated by hedgerows, some forest. Generally much more fertile appearance. Some vineyards. Willows prominent, also poplars in flat bottom-land landscape of the valley

of Arnon R. Much cultivation here. S. of Reuilly willows and poplar very abundant for a considerable distance, esp. along the river. Both are hosts to Viscum. Some marshy land and low pasture, cultivation fields separated by hedgerows with line of willows or poplar. Willows mostly pollarded, light silvery green. Plantations of poplars very common near St. Leger. Orchards common around Issoudun.

South of Issoudun the r. leaves the bottom-land and crosses a slightly higher gently rolling calcareous plain, mostly covered by open grain fields, rather few trees. Some fallow land. Soil reddish brown, full of pebbles.

Around Neuvy-Pailloux hedge-rows and patches of woods become more common. Mixed oak etc. Some open large oak with thick growth of *Populus tremula* between.

Toward Chateauroux patches of wood and brushy wet low spots become more common.

S. of Chateauroux mostly cultivated, largely grain but some vineyards, beets, alfalfa, etc. A few hedgerows, small orchards, rows of trees, but mostly open.

Then some patches of woods. Then broken wood, fields, hedgerows, etc. Then mostly woods. Then fields with hedgerows.

Then open grain fields on gray soil, sometimes with occasional patches of woods.

All of this part rolling land. Proportion of forest varies. Occ. ravines and scarps. These brushy.

Southward the land becomes rougher, to Chabenet.

South along the valley of the Creuse - valley bottom flat, with small fields, rows of trees, etc. Side hilly, with vineyards, small fields, hedgerows, patches of brush and woods. Southward rolling land, grain fields

pastures, hedgerows.

Some vineyards, patches of woods, mostly of young second-growth with scattered seed trees.

Near Eguizon is a large patch of woods. From Argenton through Eguizon and south to St. Sebastien the rr. climbs a considerable grade.

The plateau around St. Sebastien is in pasture and misc. cultivation, fields separated by hedgerows and rows of trees. Soil gray-brownish. 1-2 oaks and other decid. kind, incl. considerable chestnut.

Grade down through La Souterraine and beyond still fields, hedges, patches of wood. Greener here than farther north. (Photos both north and south of La Souterraine, hedge, etc.) Landscape more and more dominated by trees. Fields 1-3 acres.

Country gets more hilly S. of St. Pierre with woods largely made up of chestnut, Ravine of La Gasterne

very attractive, with young birch woods on s. side, heather on north.

South of this misc-cultivation with small fields, hedges, large areas of forest. Country quite hilly - hills 600-680 m. Woods have fair % of

chestnut - heavily blooming and just past blooming.

Higher hills are wooded around ~~Ambazac~~ St. Sulpice, dominantly chestnut. South of here hills are wooded, rolling ground cultivated, to Rafanhere and beyond. S. of here

not so hilly but still much of the land is wooded esp. with chestnut, much of which is coppiced - probably for bark. Valley around Ambazac mostly cultivated but many patches and rows of trees. South of there, more low wooded hills.

South of Limoge - Vallee de Vienne rolling hills, mostly cult. with rows and patches of trees.

Trees along river. Some steep slopes ^{in bluffs} covered by heather.

Hedgerows between fields, fruit trees around houses.

As everywhere, Robinia on r.r. cuts and banks, but here rather locally. Trees largely oak and chestnuts.

Near Beynac some fair sized areas of forest. South of the Puyodun common on partly wooded slopes.

Oaks in this region frequently have a tall straight trunk and small umbrella-shaped crown, and all along the trunk a bushy cylinder of shorter branches. Probably the result of removal of lateral branches after tree has reached full height.

R.R. climbs out of valley onto a rather rolling plateau. Largely cultivated. Fair sized fields separated by hedges rows with trees (mostly oaks) grain and alfalfa. Vic. of Nexon.

South of Nexen some patches of wood, largely chestnut. Patchwork of fields separated by hedgerows with oaks. Some patches of Ulex, Erica, Cytisus, esp. on steep cuts and hilltops.

Near Lafarge some patches of chestnut coppice on low hills. Pteridium abundant in waste places, road cuts, etc. Some patches of fairly good forest, mostly chestnut, s. of La Farge. Except for areas of wood, same pattern of cultivation and hedgerows continues southward, but chestnut coppice areas are more abundant. Land becomes less hilly and more rolling toward

Bussières-Galant. South of this a mixture of chestnut coppice and mixed cultivation, with chestnut predominating, less so toward La Coquille.

S. of La Coquille Ailanthus altissima is established along the r.r. for about 100 m.

S. of here a few dead chestnut trees. Little or no coppice, some areas of heath, brown birch

etc. gorse, aspen, etc.

n. of Mavalieu. Large open areas of bracken, gorse, heather just s. of it. ~~s. of it.~~

Interspersed with this areas of cultivation and of scrubby forest. Extends to tunnel.

South of tunnel land seems much more fertile and more thoroughly cultivated. Little forest, no heath, to Thiviers.

More Ailanthus just s. of Thiviers. South of this largely cult. but some thin forest mostly pine with chestnut and oak undergrowth. This with patches of gorse, becomes more or less dominant southward, ~~then some~~

some cult., esp. vineyards, maize, pasture ~~to~~ toward Nequander. S. of here, walnut trees common, some vineyards, pine forests on hills or knolls.

Some heaths. Then much scrubby forest of oak and chestnut with scattered taller pines. Some good pine forest, but always with under-

story of hardwood. Near Ligeux some fairly good oak-chestnut forests.

Still some pine. Walnuts around village. Misc. cult. esp. maize + pasture. Willows and poplars in flat valley in pasture.

S. of this some vineyards, grain fields, patches of pine woods. Misc. cult. Same flat valley with pastures, willows + poplars.

Phragmites in wet places. South of this, near Agonac, some rather open country, pasture and grain, with some walnut trees around fields, etc. Pulp wood produced in this general area. Same flat valley with willow + poplar to south. Little misc. cult., vineyards, scattered walnuts, patches of woods, pine or oak or mixed.

In this general area much misc. grain, alfalfa, some beets, potatoes + Helianthus tuberosa. Mustard, more pasture. Some heath on slopes. Some slopes with junipers, near Chateau-l'Eveque. Much pulp wood here.

becomes more hilly and more wooded to south, pine and hardwoods.

Some eroded slopes. Valley bottom flat, cult.

Same general pattern to Perigueux. East of Perigueux hills are wooded, some s. slopes open with small junipers. Woods are pine being replaced by hardwood, or ~~juniper~~ rather scrubby hardwood. Flat valley bottoms and gentler slopes cultivated. Some fields separated by hedgerows, others not. Nivernac. East of this the hills become ~~lower~~ lower and with more open meadows, though still generally wooded. Woods denser on north facing slopes. Much pasture in valley bottoms and on lower slopes.

Beyond here an extensive fire scar a year or two old in which sparse scrub appears to have been burned. Pteridium now dominant between the old sticks.

Pteridium generally common here in unused open land, except on calcareous slopes dominated by open junipers and grass. *Pteridium* is ground cover in scrub or very young forest, and in open forest generally. Heather very local.

Toward Les Eyzies the hills become lower and partly open, partly wooded. Many calcareous slopes with scattered junipers. Woods here scrubby mixed hardwood with scattered pines and patches of pine. Cliffs and rock outcrops more common.

are persistent from cultivation are common here, esp. *Ficus carica*.

The valley floor has the usual poplar and willows, many elms, and some *Acer negundo*. Cultivated fields. River lined with willow and poplar. Great masses of *Potamogeton* and *Ranunculus aquatilis* in river. The latter making masses of white bloom.

July 25 - Les Eyzies

Flat green river valley cut in flat beds of limestone which form cliffs ^{on both sides} with broad dry ledges. The cliffs and ledges are either bare or covered by a xerophytic vegetation of *Quercus ilex*, several other species or forms of *Quercus*, *Pinus* sp. (? needles), *Sedum*, *Prunus*, *Hedera*, *Viburnum lantana*, *Platanus*, *Acer monspessulanum*, *Cornus sanguinea*, many small labiates and other herbs, esp. umbellifers and legumes, several *Campanulas* and other *Campanulaceae*.

In crevices in cliffs esp. where overhanging and shaded, *Adiantum* is very common. In grottoes it is abundant.

On the cliffs *Hedera helix* forms great masses clinging very closely to the rock, lower stems many cm. thick. An *Orobanch* is common, possibly parasitic on the *Hedera*. Quite a few plants that

July 25 - Les Eygies
dry limestone ledges
on cliffs, in scrub vegetation

335848

Quercus ilex

7

49

Quercus ilex

3

50

Quercus ilex

2

51

Quercus

2

52

Quercus

2

53

Quercus

2

54

Teucrium

local, in full sun

2

55

Parietaria

very common in crevices

1

56

Teucrium

occasional in full sun, crevices

2

57

Helianthemum

rare, in full sun, crevices

2

58

Asperula

common

3

59

Teucrium

local in full sun, crevices

3

60

*Adiantum*abundant on shaded cliffs
and in small grottoes

2

61

*Saxifraga?*occasional on shaded rocks
in

July 26 - same

2

62

Acer monspessulanum

common in thickets on ledges

1

(63

Quercus ilex

2

64

Quercus ilex

common in thickets on ledges

shrub 2.5 m. tall, gray.

tree 6 m. tall.

shrub 2.5 m. tall.

small tree 4 m. tall.

small tree 4 m. tall.

shrub 2.5 m. tall.

flowers whitish; plant
pleasantly aromatic.stems procumbent to
weakly ascending.

flowers rose purple.

from root crown;
flowers white.

flowers dull yellow.

fronds hanging.

leaves delicate, light green,
flowers white.

small crooked tree, 4 m. tall.

small tree, gray-green.

35865

Quercus

2

common in thickets on dry ledges

1

66

orch.

rare in thicket on dry ledge.

2

67

*Orobanché*common (possibly parasitic on roots of *Hedera*) at base of cliffs

1

68

Equisetum

common at bases of cliffs

2

69

Potamogeton

abundant in slowly running water several ft. deep.

3

70

Ranunculus aquatilis

abundant in slowly running water several ft. deep.

small tree, more finely lobed leaves from sprouts on trunk.

flowers tan to purplish.

erect, forming large colonies, up to 1 m. tall.

leaves floating.

leaves submerged, flowers on pedicels several cm. above surface, white.

July 26 R. Vézère below
Les Eyzies - steep
limestone slopes at foot
of cliffs on s.w. side -
of scrub-forest of
Quercus ilex. Slopes
on other side low forest
of deciduous oaks, etc.
Valley bottom with
cult. fields, walnut
trees, rows of willow
and populus - 2 sps.
Much Helianthus locally.

At Le Bugue the valley bottom
is much wider. Some
vineyards, misc. cult.

Hills on both sides rather
bare except for juniper scrub.

Below this, lower slopes
of hills cultivated, upper
slopes wooded, mainly pine.
Valley floor very flat.

Then Vézère joins Dordogne.
Hills here, at Le Brisson, are
more gently rounded, partly
cultivated to tops, some woods.
Up this valley. This almost
entirely misc. cult., some
trees mostly in rows except
for belt of river forest
of Salix, Ulmus, Populus,
Quercus, Fraxinus, etc.
and some small poplar
plantations.

grain, maize, tobacco,
beets, alfalfa, a few grapes,
some Helianthus tuberosus are
principal crops noticed.

Same to Liorac en Périgord.
After this the r.r. leaves
the valley and climbs
up a small south tribu-
tary where there are on the
n.e. side, again some
dry rock slopes with
junipers, on s.w. side
woods of pine and hardwood.
Around Belvès cultivation
and pasture goes almost ^{or quite} to
tops of hills. Valley bottom
narrow, cultivated. Hills
above this gentle but
rather high. Up the valley
toward Le Gât the
valley becomes more
wooded, principally
with pine and an
understory of oaks, the
oak dominant where
pine has been removed,
absent where pine is too
thick. Occasional chestnut
and other broad-leaf trees.
Robinia abundant along
r.r. Juniper in thin
places in pine on s.w.
slopes.

Descending valley of la Lemanne from Le Got pattern of cultivation, pastures, and patches of woods. oaks or pine with oak understory. Willow along the ditch or rivulet in valley bottom. Hills rather gently rolling. Some hedgerows of Crataegus, etc. Thus to Villefranche du Perigord, where woods have become dominant. Below here hills largely wooded, flat valley bottom cult. with rows of poplars. Some bare limestone cliffs and steep bushy limestone slopes. Below Lauretelle la Lemanne the valley opens out somewhat and the hills become lower - cult. part way up, scrub or woods on slopes and tops. Misc. cult. a few patches of poplar, some hedges in valley bottom. At St. Front it narrows again and hills are bushy to base. scrub forest of oak. Some rather bare steep slopes, badly eroded. At Cuzorn there are cliffs along the valley bottom, but hills are otherwise gentle. Generally

somewhat open and scrubby, some juniper. Some wooded with pine. Some slopes cultivated. Below this the valley widens out and there are flat or gently rolling cultivated plains 1-2 km. wide. gentle rounded slopes to the sides. Some vineyards, some hedgerows, some pasture, some rows of poplars, misc. cult., narrow strips of mixed wood along stream.

Below Monsempion-Libos the valley (Lot V.) is much wider - flat. Misc. cult. Vineyards, orchard, tobacco, grain, maize, vegetables, pastures. Narrow riverbank forest, some and some patches of poplar. Lower down are limestone bluffs along river, apparently sides of low flat topped erosion remnants. Tops of hills along valley wooded, slopes cult. and pasture. Around Penne the country becomes broken

and hilly. Gentler slopes cultivated or pastured, some vineyards. Steeper slopes and knobs wooded except some rock slopes and cliffs which are bare or brushy. Grain, alfalfa vineyards, pastures, some hedgerows in flat bottoms. Climbing up a winding valley ~~toward~~ ^{de Laetige} toward Hautpape. Auradon this pattern ~~remains~~ continues with grain and pasture becoming dominant. Thickets of Robinia along r.r. Knobby country. More patches of woods, mostly oak or oak & elm toward head of valley. Long tunnel. After Laragne hills with patches of woods and pasture, some cultivation - vineyards, potatoes, beans, grain, etc. ~~increasing~~ downward. Some limestone slopes with sparse juniper. Hills become gentler, more rolling, tops tend to be wooded. Low hedgerows, more downward. Valley widens and hills become lower toward the Garonne.

Valley bottom is misc. cult. hill slopes mostly pastured.

At Agen are white cliffs, probably limestone. Houses built into excavations in them.

Garonne Valley has very broad flood plain with patchwork of misc. cult., grain, ~~corn~~ maize, vineyards, vegetables of various sorts, alfalfa, pastures, with some hedgerows and rows of poplar and willows. A few small patches of poplars. Along the banks of the Garonne are thickets of willow and rows of poplars. Orchards and rows of fruit trees in fields of other things. Apricots and peaches. Some small patches of mixed poplar, willow and other broad-leaved trees.

The small size of the plots, mostly an acre or two or less is striking. Trees are an important part of the landscape, even where the entire countryside is cultivated.

Up river from Valence more or less same pattern. River valley very broad here. Some other trees besides poplars along road, e.g. Platanus, oak, elm, lindens. Canals lined by trees, also. Slopes n. of valley wooded along Tarn R. Then cult. with vineyards at Moissac. Patches of young Populus forest in low spots along R. Tarn. Willows belt rather narrow.

Above the Tarn, the Garonne V. is so wide that the hills on the side are not visible from the train. Castelsarrasin. Miscellaneous cultivation, trees prominent in landscape.

France
1954

July 28 - south from Toulouse
the valley of the Garonne
is largely in grain (already
harvested) and some alfalfa
and vineyards - very flat
country, rows of trees and
a few wood-lots, but becoming
less for a few km. Then
more with some patches.
A low but sharp escarpment
on east side. Trees esp.
along watercourses and
on escarpment, also around
houses. Escarpment becomes
higher, more broken, more
wooded, landscape on
plate below more character-
ized by trees southward
until just before Longages
the landscape is quite
green in spite of brown
stubble fields. Vineyards
more abundant about
Longages - now, 75% or more
of cover here. Here the
escarpment is less
sharp and less wooded.

Near Carbonne an
escarpment to the west
becomes visible. Vineyards
less abundant, alfalfa
and maize more so, some
grain fewer trees, some
hedgerows but not many.

Then rather open
flat land, large
fields and large vineyards
southward again,
more trees and more
vineyards, some solid
patches of Robinia and
of Citrus. A few hedges
and many rows of trees.

Hills in distance on
both sides partly wooded,
partly cult. and meadow.
S. from Cazères, more or
less the same pattern,
less vineyards. Grain
being harvested.

At Martres-Tolosane
the flat valley floor
narrows rapidly,
rather high wooded
hills approaching on
both sides. Woods mostly
hardwood, dense but
appearing rather scrubby.

Crossing the Garonne
s. of Bourdeaux - narrow
belts of willows on both
sides.

Follow east of the small
range called Plantaurel -
Petites Pyrénées - scrubby
and rocky with cliffs
and steep slopes. Valley
here very green with

pastures, abundant trees, hedgerows, misc. cult. - grain, maize, potatoes. Large areas separated by hedgerows, these areas divided into many small patches of different crops.

Kabarthé - Ward.

Southward same pattern high wooded hills to east, low ridge to west. hedgerows more abundant, with trees.

RR skirts base of w. ridge which is wooded with small pastures dominant in some areas. Mixed broadleaf woods, some very fine old trees locally.

Toward St. Gaudens hills are cultivated.

Across valley are high densely wooded hills, foothills of Pyrenees.

After St. Gaudens the valley abruptly widens - is green with broad meadows and pastures, some grain fields, few trees, some very low hedgerows. a little cultivation of maize, beets, potatoes, etc. Vineyard locally around villages.

Foothills of Pyrenees rise very abruptly from flat valley floor.

Further on less pasture, more diversified cultivation.

Foothills thickly wooded, but showing evidence of vertical strips of different management stages - done in narrow vertical bands which seem to be clear cut.

Montrejean - Gourdain - Polignan - 420 m.

From here, still following the Garonne, but climbing, between brushy ~~hills~~ or wooded hills. The higher Pyrenees visible above the hills to the south (n. goes west from Montrejean).

Along n. on slope n. of Garonne V. thickets of Robinia, patches of cultivation. Valley very green, cultivated fields, patches of wood, hedgerows, rows of trees. Trees dominate landscape. Grain fields are yellow. Trees mainly ~~oak~~ oak + chestnut, even on valley floor here, though willows + poplars ~~not~~

not absent.

Then m. emerges onto a broad open plain, a vast alluvial fan with patches of trees, pastures and cultivation some hedgerows.

610 m. Lannemeyan - The Plateau de Lannemeyan is the great alluvial fan which is crossed by r.r. east to west.

Rows and patches of woods, pastures, cult. fields, areas of scrub, and broom. Then vast open areas, mostly in pasture, only a few very stunted trees - to Capvern

From here descends the slope of fan which is dissected. Steeper slopes wooded, gentler ones pastured, more level places grain fields. Fields and pastures separated by hedgerows. Some vineyards. Some fine patches of oak woods.

Dissection becomes deeper as m. goes down a rather steep grade.

Lower down extensive slopes covered by scrub and bracken.

Then, flat bottoms of ravines wider out and cultivation becomes more general, with grain, vineyards, maize, potatoes, etc. Poplars and willows appear, esp. along streams. Grain being harvested or ready to harvest.

To Tournay. - here flat valley bottoms as 1 km. or more wide - cult. with ~~but~~ some rows of trees and hedgerows. Tarbes - 720 m.

July 18 Tarbes - Amprevielle flat valley bottom, misc. cult. many trees.

Valley of Adour R. - misc. cult, some vineyards, rows of trees, fruit trees around villages; mostly grain and maize, some potatoes, a little alfalfa, beets, etc. Small patches, carefully tended. Center of valley with few houses or trees, both more numerous to both sides.

Near Vielle - Adour the valley starts to narrow rapidly. The hills on both sides are partly ~~or~~ wooded, partly cult. partly pastured.

Maize mostly planted in rows, but ~~many~~ ^{many} patches seen below Ordiyan planted in hills with beans in each hill.

Some patches of chestnuts on hills, but mostly mixed thickets, Alnus, Robinia, Betula, Fraxinus, Quercus, etc.

July 28

auto

Bagnères de Bigorre - in valley of Adour R. surrounded by luxuriant cultivation and the ornamental vegetation in the town is luxuriant and varied. The east slope of the valley above the town is very steep, rock, with cover of low scrub. The w. side is more gently sloping and is partly cultivated, partly wooded, but mostly hay meadows.

Well above the town, at 1000 m. or more, the walls of the valley tend to be covered by a dense forest of beech. Wherever this is bounded by meadows the transition

is very abrupt. The effect is of dense masses of dull dark green against the bright green meadow. Upward this cover becomes almost continuous.

At perhaps 1500 m. the beech becomes mixed with fir and spruce, these becoming dominant. This belt is perhaps 200 m. wide and the trees are conspicuously lichen-covered, indicating at least a high incidence of fog at this level. Dr. Roche (Roche) confirms this, saying that clouds are commonly encountered at these altitudes. Usnea is especially conspicuous hanging from the limbs of the conifers.

Above the spruce-fir forest there is meadow with a dense turf of many species. This is prominent around La Mongie, at the base of the Pic du Midi "Teleferique" or cable-way. Above this on rocky crests and outcrops are scattered dwarf pines (*Pinus mugo*) up to about 2300 m.

July 28 - Pic du Midi
de Bigorre - trip by
overhead cable from 1760 m.
at La Mongie to summit.

This series of canyons,
cliffs and slopes is extremely
rugged, with rocks
outcrops and talus in
great expanses. The
rock is a folded series
of beds of limestone and
schist. The folding is
intense with the "wave-length"
of the folds varying from
several cm. to 100 m. or more.
Some shattering, shearing
and ^{minor} faulting also.

Talus is generally grassy
except where rather coarse,
where it has a low discon-
tinuous scrub of Rhododendron
perhaps several dm. tall,
low rounded flattish clumps.
Rhododendron also covers
some rocky outcrops.

Everywhere there is the
close pattern of sheep
grazing paths - there might
be taken for the result of
intensive frost action and
solifluction, were it not
for the presence of numerous
sheep even in seemingly
inaccessible places on tiny

La Taoullet

bits of talus.

The only woody plants
seen larger than the
Rhododendrons were a
scattering of small
pines (*Pinus uncinata*)
along the sharp rocky
crest on which the
"Midway" station of
the cableway is situated.
There are stunted trees
only a very few m. tall
and, though they form
a conspicuous strip
along this crest at
about 2300 m. are so
scattered as not to form
any sort of forest.

The Pic proper is a
very precipitous spine of
rock 2857 m. high (lat.
42° 56' 12" N, long. 0° 8' 32" E),
mostly mesozoic calcareous
rock, bluish and massive,
interbedded with shists,
severely folded.

Annual precipitation about
2.20 m., average of 4 m. snow
in winter; snow storms have
been recorded every month
(e.g. possibly July), severe ones
until May and sometimes
again in September, but
generally good weather till

sometimes in November. Severe and frequent electric storms especially in May & June.

Although the talus of the middle slopes, and even the rock outcrops, are covered by a rather continuous turf or heath, near the top there are principally isolated clumps, tufts, and cushions on the talus, on ledges, and in crevices. In a few gently sloping grassy spots the vegetation is more or less continuous, but only very locally. All species seen except

~~are~~ ^{are} ap low, depressed or compact in habit. Most ~~are~~ are either densely pubescent or fleshy.

On the schistose areas the flora ~~was~~ is more restricted than on the calcareous ones, but most of the species from the schist are also to be found on the calcareous soil. This is probably because of the small area and close proximity of one to the other and the movement of soil from one

to the other.

The sheep even climb to the top of the mountain, where they are quite a nuisance, destroying the plants in the small alpine garden maintained by the botany dept. of the University of Toulouse, in connection with the Observatory.

In this garden they are attempting to bring together the high altitude plants of the Pyrenees and even some from the alps. Also they are trying out some from much lower altitudes to determine their tolerance. M. Droussant, the gardener in charge, says that this site is rather too high to provide ideal conditions for most alpine plants. Has some difficulty with some of them. They are also carrying on some biological and pharmaceutical studies, but on a very minor scale. Are installing a tiny biochemical laboratory.

July 28 La Mongie, Pic du
Midi de Bigorre

green meadows,
closely grazed, on slopes

35871
2

Galium

very common, especially
around rock outcrops

2

72

Trifolium

common, especially
around rock outcrops.

2

73

Jasione

common

1

74

Viola

common on slopes
near buildings where
grazing is less severe.

July 28 Pic du Midi de
Bigorre, near summit
shattered limestone rock

1

75

Oxytropis

common on ^{rock} debris

2

76

Veronica nummularifolia

occasional on patches
of ^{rock} debris.

1

77

Arenaria

~~common~~ common in
crevices and on ^{rock} debris.

2

78

Gentiana verna

occasional on ^{rock} debris

2

79

Androsace

occasional on ^{rock} debris

1

80

Iberis

occasional on ^{rock} debris.

1760 m.

flowers white

flowers rose-purple.

flowers purplish-blue.

flowers violet

2850 m.

flowers deep purple.

flowers blue-violet

flowers white.

caespitose in small loose
tufts; flowers intense blue.

~~flowers~~ caespitose, flowers
pinkish white.

flowers lavender; leaves
sub-fleshy.

- 35881 *Geum montanum*
common locally on ^{rock} debris
- 2 82
common locally in crevices
- 1 83 *Potentilla rupestris*
common on rock debris.
- 2 84 *Myosotis*
occasional on rock debris
- 1 85 *Lotus*
occasional on rock debris
- 2 86 *Festuca*
occasional on rock debris.
- 1 87
common on rock debris
- 2 88 *Oxytropis*
occasional on rock debris
- 2 89 *Pedicularis*
occasional on rock debris.
- 2 90 *Statice* (Armenia)
occasional on rock debris
- 1 91 *Carlina*
rare on rock debris.
- 2 92 *Poa*
common locally on
fine rock debris.
- 1 93 *Salix*
very local on fine rock debris
- 1 94 *Salix reticulata*
very local on fine rock debris.
- 2 95 *Taraxacum*
occasional on rock debris.

- small tufts; flowers
bright yellow.
caespitose.
- flowers bright yellow.
caespitose in small tufts;
flowers light blue.
- prostrate, caespitose, forming
small mats; flowers
deep yellow, with orange
red ones occasional (perhaps
old ones?).
forming dense prickly
mats.
- caespitose; flowers
deep rose-purple.
- caespitose; flowers pale
yellow.
- flowers ~~deep~~ maroon-purple.
- caespitose; flowers rose pink.
heads purple.
- prostrate; leaves smooth,
light green.
- prostrate, leaves very
rugose.
heads bright yellow.

July 29 - same - siliceous
schistose rocks.

35896

Poa

1 common on fine rock debris.

1 97

Draba

occasional in crevices

2 98

Oxyria digyna

occasional in sheltered
spots on fine rock debris.

1 99

occasional on steep rock
slopes, in crevices.

35900

Hutchinsonia

1 common in crevice and on ledge.

1 01

Cerastium

occasional in crevices

2 02

Chrysanthemum

common on rock debris

1 03

Erigeron

rare in rock crevices

1 04

Globularia

rare in rock crevices

1 05

Papaver

rare in ^{rock} debris

2 06

Galium pyrenaicum

common in ^{rock} debris and crevices

2 07

Thymus

common on rock debris

2 08

common on rock debris
and in crevices.

1 09

Artemisia

rare in rock crevices

1 10

Linaria

rare on rock debris.

flowers yellow.

scapes erect; flowers
dark red.

caespitose; heads bright
yellow.

caespitose; flowers white.

flowers white.

rays white, disk yellow.

rays lavender.

flowers blue-lavender.

flowers light yellow;

foliage glaucous.

forming dense mats;

flowers cream-~~ish~~ yellow.

prostrate; flowers
bright purple.

flowers white (with #35911, 35912)
(to pp. 144-145)

July 29 - Toulouse toward
Carcassonne

Almost flat valley of R. l'Hers
mostly cultivated,
some pasture, very few
patches of woods, some
rows of trees, a few hedgerows.
Some vineyards but not
many, grain, maize,
alfalfa, etc.

The low hills on the
sides of the valley also
show about the same
pattern. Almost no woods.

A few sizeable patches
of forest on the south side
and in the valley floor before
Villefranche de Lauragais.

Many more trees in vicinity
of the town than away from
it (usual condition).

Rows of poplars and Platanus
very common ~~and~~ south east
of here. Valley ravine
narrows rapidly.

Very narrow band of thick
woods along river banks.

Willows common. To the
east the hills become
less cultivated and more
pastured, with patches
of scrub and brown.

Some bad erosion scars
on the hills.

Pass imperceptibly over
the divide bet. ~~Atlantic~~
Atlantic and Mediterranean
drainages, into the
valley of R. Fresquel.

Just before Castelnaudary,
first ^{rows of} cypresses appear.
Planted for wind-breaks.

Rows of willows and
poplars common. Valley
intensively cultivated.
Hills to south appear rather
bare and drab from a distance.
Planted conifers very
common e. of Castelnaudary.
Some mowers.

To north, in distance the
low massif of Montagne Noire,
partly wooded.

This valley looks distinctly
drier than that of l'Hers.

Grain is practically all
harvested already. A few
patches of young oak woods
w. of Bram.

Toward Carcassonne vineyards
become more common. Rows
of trees conspicuous, esp. along
canal. Marshy spots
common along rd. Few
planted conifers east of Bram.
Vineyards become dominant
feature of landscape toward
Carcassonne.

S. of Carcassonne the level or rolling land is all in vineyards, mostly not trained on wires.

Limestone hills are mostly scrub-covered but partly wooded. First *Spartium junceum* noticed just s. of C.

Juniper and small pines abundant on hills. The hills and scarps badly over-grazed and eroded. Much bare rock exposed.

Hills more common southward. Grazed. Some olive trees. General color of landscape drab, gray-green or gray-brown, except for bright green vineyards in flat valley bottoms. Spots of dark green on hills are low dense bushes. Patches of pines planted on some small hills. Cypress hedges fairly common, esp. in vicinity of towns, as Lezignan (Aude).

At L.A. the valley has become quite wide again. Mostly in vineyards. A few very low hills are pastured and have some planted pines. Some fruit trees scattered in vineyards.

Hills at sides of valley very sparsely tree-covered, brush between, badly grazed. Largest part of ground is scrub-covered.

Rr. follows a small valley into the hills. Occasional places planted to pine. Mostly low scrub and pasture. Much bare light gray rock exposed. Olive trees still rare but becoming more common near Narbonne.

Beyond Narbonne valley is wide and flat, almost entirely in vineyards, but many with fruit trees thickly scattered in them. Hedgerows and rows of poplars, willows, Platanus very common, esp. along the abundant ditches.

Populus alba common. Low spots frequent along r. with reeds, tamarisk, grass.

After a few km. most of trees disappear. Then vineyards become less frequent (but still the greater part of land) and misc. cult. esp. grain becomes more common. Proportion of vineyards varies locally.

Hills at sides of valley low, grassy with bushes, overgrazed, Arab. A few plants coniferous on tops.

Near Colombiers valley becomes very wide again, mostly in vineyard.

To Beziers. - beyond on cut banks and eroded places a large gray bush like *Atriplex*. Rolling country, in vineyards. A few scattered pine and olive trees, rows of plane trees along canal and main road, some cypress wind-breaks. All the cypresses in the region seem to have spire-like form.

A few small patches of heather and scattered small trees, some low hills partly wooded with scrubby oaks (!).

Then, most of irregularity in ground disappears. Great areas of vineyard with scattered trees and rows of trees.

Just past Argde is a small extinct volcanic cone. Then salt flats, partly mowed, partly cult. partly

in salt marsh and succulent veg.

Large lake with salt pans inland from m. Low area around lake with halophytic veg. Area of very low dunes lining sea is cult. - vineyards and asparagus, protected by rows of reeds. Outside this, slightly higher dunes with bushes.

At Sete-Villa a rocky hill, covered by pines on landward side, by city on seaward side. The lake extends to behind this hill, which is in the edge of the city. This lake is mouth of canal which extends from beyond Agen.

Between Sete and Montpellier are a series of lagoons with a broad strip of salt marsh surrounding them and a strip of dunes between this and the sea. Back of the salt marsh is solid vineyard. Salt marsh has areas of reeds, of *salicornia*, and of marsh grass.

East of Montpellier are vineyards on flat and rolling ground, with a few scattered trees, a few rows of trees. On some small hills are patches of woods, mostly pine.

A few small woodlots of pine farther east. Rows of trees mostly *Platanus*. Some small olive groves.

On north side, away from r.r. are some small brush-covered hills.

Almost all cultivated ground is vineyard. Soil red.

Olive groves become more and more abundant. Hedges of *Arundo donax* occasional.

The low brushy hills extend eastward for some distance, becoming more and more covered by olive groves. Vineyards still occupying flat ground.

Some forests and scrub of *Quercus ilex* farther east. More grain and other cultivation than vineyards toward Nîmes.

Hills east of Nîmes covered by scrub "garrigue". Valley with meadow, grain.

fields, vineyards, etc. Some fruit trees scattered in vineyards, olives also.

Some small woodlots of young pine, some fallow land, eastward.

Dry hills, some with low scrub "garrigue", some of it burned over. Some with olive groves.

Olive trees mostly 2-4 m. tall, rather flat-topped. Some rather bad erosion in these hills. Some hills really wooded near Rhone. Willow-poplar forest along Rhone and on islands in it, at Tarascon.

East of the town are marshes and low cultivated ground, gardens, etc. orchards, some vineyards, reed hedges (*Arundo*). Rows of cypresses for wind-breaks. Thickets of willow and *Populus alba* in low place.

To northeast ~~the~~ limestone hills covered by gray-green scrub and scrub-forest. Some bare scarps exposed.

Some fair sized rice fields in flat land. Grain, vineyards and meadows on very slightly higher ground.

Fields separated by hedges in some ~~places~~ cases. More grain scattered, rather extensive thickets of willow and poplar, there along river at Arles. S. of Arles fields have low levees around them, probably used at times for rice. Extensive meadows many trees - rows of willows, planes, poplars, etc. A few vineyards here. Area very green - apparently some irrigation though ditches might be for drainage, as there are large areas of marsh. *Phragmites communis* is dominant over large part of it.

East of this are large stretches of weedy flat uncultivated land, very rocky alluvium. Woods and scrub in distance. Soil bright rusty red.

Rather barren southern slope of Alps in distance to north.

Then cultivated ground with thick willow hedgerows, some open uncultivated land, grassy

with or without scattered trees. This ~~alluvium~~ ^{area} called "la Crau". *Spartium* common. Much open scrub. Some land cultivated by piling up rocks and removing them. Some ponds. Willows a very conspicuous feature of the landscape. Again vast open sparsely grassy plain - some attempt being made to pile up the rocks but certainly not a very encouraging task as the ground is largely made up of rocks.

Salon.

Some dissected hilly country before Marseille. flat places cult., rougher over weedy, or with scrub and patches of woods.

Around lake a considerable surface of bare rock with a sparse low scrub.

Then cultivated ground with closely spaced rows of cypresses for wind breaks.

East of Marseilles are rather rugged hills ~~with~~ of limestone with many cliffs. They are covered by a rather sparse and scrubby pine forest with an understory of scrub. Lower slopes near sea terraced and cultivated, vineyards and olives.

La Chiotat.

Pines and olives mixed near sea, pine woods inland.

Eastward hills become lower, gently sloping. Large areas scrub-covered, some pine forests, some olive groves, esp. near sea. General color a dark dull green. Then rather rugged again.

At St. Cyr is a large flat valley, mostly in vineyard and olive groves, also rows of olive trees between the vineyards.

Eastward the hills are rather rugged, partly wooded, partly scrubby vineyards and orchards, olives, etc. locally. Eastward more scrub, "garrigue", dark green, with bristly, low, bushes 0.5-1 m. tall,

touching or not. At least some pines generally, but much scrub. Lower slopes often terraced.

Ollioules

flat land in vineyard and flower cultivation.

Many olives. Surrounding hills very rocky and rather barren. Rows of cypresses common. Some pine woods on low hills. Similar to Toulons.

July 28 - Pic du Midi (std.)

35911

Linaria

common on rock debris.

~~42~~

1 12

Linaria

occasional on rock debris.

2 13

Potentilla nivea

common in rock crevices.

2 14

Arenaria

common in rock crevices.

2 15

*Arenaria*common in rock crevices
and on ledges.

1 16

*Silene acaulis*common in rock crevices
and on ledges.

1 17

Hutchinsonia

common on ledges and in crevices.

2 18

*Petrocalis*common on ledges, and in crevices,
and in rock debris.

1 19

Erysimum

rare in rock crevices.

~~42~~

July 30 - Antibes

1 20

*Gelidium*common in crevices just
below low tide level.

2 21

Limonium

rocks just above high tide

2 22

*Rubia*common, characteristic of *Quercus ilex*

flowers blue-violet,

palate whitish, & the common

— form here (with #35910, 35912)

flowers blue-violet,

— palate orange (with #35910, 35911)
caespitose; fls. cream
color.

prostrate; flowers

— white.

forming a dense mat;
flowers pale green.forming cushions; flowers
pink.

flowers white.

flowers deep lavender.

flowers bright yellow.

deep red

calyx lavender with white
tips, corolla blue.scrambling in low bushes,
association. fruit black & fleshy when ripe.

July 30 ~~to~~ Cap d'Antibes
walk with Guinochet
- small patch of
maquis - a thick
scrub 2-3 m. tall, with
Cistus monspeliensis
Myrtus communis
Pistacia lentiscus
Rhamnus alaternus
Rubus sp.
Spartium junceum
Calycotome spinosa
Tarnus

On the hill around the
lighthouse some remnants
of *Quercus ilex* - *Q. pubescens*
forest, but with *Olea*
abundant. *Pinus halepensis*
forest below on flatter
portions.

The general relationships
here, according to Guinochet,
are that the *Quercus ilex* -
Q. pubescens forest was the
original cover on calcareous
rocks. When this is cleared
it tends to be replaced by
maquis. This is readily
replaced by *Pinus halepensis*
which is, in turn, gradually
replaced by *Quercus ilex* if
not burned over. This
pattern general on calcareous

rocks east to Var R.
and below 300-400 m,
above which *Quercus pubescens*
is thought to have been
dominant in the original
cover. East of Var R. along
the coast was a strip
of *Ceratonia* - *Olea* forest.

On the crystalline rocks
the original cover was
thought to be *Quercus*
ilex - *Q. suber* forest,
with *Pinus* secondary.

Above this, *Quercus ilex* -
Q. pubescens forest.

Mediterranean species
observed:

Centaurea peniculata
Asperula cynanchoides
Euphorbia spinosa
Camphorosma sp.
Tunica saxatilis.

Garrigue vs. Maquis - acc. Guinochet
Distinction physiognomic -
Garrigue is low, sparse,
ground visible between
bushes, mostly on calcareous
soils. Maquis 2-3 m.
tall, dense. Chaparral-like.

July 31 - Esterel, ^{near Gratatdis,} about 3 km inland from Agay, on Que R.

Quercus suber - *Pinus pinaster* woodland - trees separated, with *garigue* beneath them of, ~~in~~ in addition to young pines and oaks,

Cistus monspeliensis

Cistus salvicifolius

Daphne genkya L.

Pistacia lentiscus

Lonicera sp.

Asparagus acutifolius

Phillyrea angustifolia

Pteridium aquilinum

July 31 - near Gratatdis, about 3 km. inland from Agay on Que River, Esterel
Quercus suber - *Pinus pinaster* woodland.

35923 *Origanum vulgare*
~~roadside~~

24 *Quercus suber*
dominant tree in

July 31 - Col Belle Barbe
on Que River, Esterel

Quercus suber woodland
with some pine, *garigue* undergrowth

25 *Linum gallicum*
weedy openings

26 *Centaurea paniculata* var. *esterensis*
common in weedy openings

In habit *Quercus suber* looks much like *Q. wislizenii* or *Q. chrysolepis*, or when large, *Q. agrifolia*, of S.W. U.S.

The pines tend to invade after fires, but are regarded as a normal part of vegetation.

35 m.

strongly aromatic herb;
calyx purple, corolla pinkish.
tree 6 m. tall, 20 cm. diam;
bark harvested for cork.

44 m.

flowers bright yellow.

erect, biennial; flowers
rose-pink.

July 31 - Gue R. between
Col. Belle Marbe and Mal Infernet,
Esterel

- 34 in cork-oak woodland
with garrigue undergrowth
- 35927 *Cistus salvicifolia*
3 codominant species in garrigue
- 3 28 *Cistus monspeliensis*
codominant species in garrigue
- 3 29 *Arbutus unedo*
occasional in garrigue
- 1 30 *Fumana*
occasional in
- 2 31 *Lavendula stoechas*
common in
- 1 32 *Myrtus communis*
common in
- 2 33 *Rhus cotinus*
rare
- 2 34 *Daphne genkwa* L.
common
- 1 35 *Molinia caerulea*
very local, in small seep
of water

This country is generally
covered by a sparse, uneven
stand of *Pinus pinaster* and
considerable *Quercus suber*.
Beneath this is a garrigue
(maquis if tall and dense)
of such plants as *Lavendula*

45 -
60 m.

shrub 0.7 m. tall.

shrub 0.7 m. tall.

shrub 1.5 m. tall; fruit
immature, pendent.

shrub 0.5 m. tall.

strongly aromatic.
shrub 1-1.5 m. tall,
aromatic when broken; flowers
white.

shrub 1.5 m. tall.

shrub 0.8 m. tall; ~~flowers~~
principally branched
at base; flowers whitish.
erect 1.3 m. tall.

Phillyrea angustifolia
stoechas, *Helichrysum stoechas*,
Helianthemum tuberosum,
Erica arborea, *E. scoparia*,
Calluna vulgaris, *Arbutus*
unedo, *Juniperus oxycedrus*,
Myrtus communis, *Stihelina*
dubia, *Globularia* sp., *Dorichium*

^{Fumana spp.,}
 pentaphyllum, Calycotome
 spinosa, Rhamnus alater-
 nus, Daphne gnidium, Rhus
 cotinus, Amelanchier sp.,
 Pistacia terebinthus,
 P. lentiscus, and Rubus
 tomentosus (perhaps only in
 disturbed places.)

After fires the pines
 may appear at the
 same time as the scrub
 and may, locally,
 form an almost complete
 cover 1-2 m. tall. However,
 there are few really closed
 stands of mature pines.

^{Hills above}
 July 31 - ~~Les~~ Trayas, on
 seaward side of l'Estérel,
 Alpes Maritimes

Almost closed scrub
 or "garrigue" on ^{dry} rocky slopes.

35936

Pinus

1

common throughout region

2

37

Calluna vulgaris

occasional in

2

38

Erica arborea

common in

1

39

Asplenium adiantum-nigrum

occasional in rock crevices

1

40

Galium rubrum

occasional at base of rocks

In a wet seepy spot
 are Molinia caerulea,
 Osmunda regalis and
 Alnus glutinosa.

There are great knobs of
 red porphyry with enormous
 talus slopes, but, acc.
 M. Guinochet, no special
 flora on the talus.

The pines here are
 generally small
 trees, not more than
 10 or 15 m. tall, 20-25 cm.
 or less thick. Here all
 are Pinus pinaster (P. maritima)

The garrigue on the seaward
 slopes is like that inland but
 has Rosmarinus ^{and Vitex} added in signi-
 ficant amounts, and oaks are princi-
 pally in the canyons. Scrub 1-1.5 m. tall.
 tree 10 m. tall, 15 cm. thick.

shrub 1 m. tall, flowers
 pale purplish pink, shiny.
 shrub 1.3 m. tall.

erect, many stems from base.

- 35941 ~~Helich~~ *Lavendula stoechas*
very common in
2 42 *Erica scoparia*
occasional in
3 43 *Quercus ilex*
common in ravines
2 44 *Juniperus oxycedrus*
occasional

July 31 - 3 km. n.w. of
Antibes
garigue burned over
2 years ago, bushes
far apart.

- 2 45 *Prunella hyssopifolia*
occasional
1 46 *Linum strictum*
rare
1 47 *Andropogon ischaemum*
rare
1 48 *Dianthus*
occasional
1 49 *Lithospermum*
common
2 50 *Fumana*
common
2 52 *Cistus albidus*
common
1 53 *Picris*
rare
1 54 *Lavendula*
rare
1 55 *Euphorbia*

shrub 0.5 m. tall,
aromatic.

shrub 1.5 m. tall

tree 5 m. tall

tree 4 m. tall, broadly
spine-like habit,
fruit not quite mature.

flowers crimson

plants dry,

flowers bright yellow.

low shrub

erect, flowers yellow

erect, flowers blue

stem red, flowers green.

- 35956 *Teucrium*
local
57 *Therium*
rare
58
common
59 *Inula*
common
60 *Asperula cynanchoides*
common
61
occasional
62 *Galium*
occasional
63 *Campanula*
occasional

This rather extensive
burned area has scattered
low shrubs, mainly
Pistacia lentiscus, *Daphne*
gnidium, a few small
Erica, a few small oaks.
These probably mostly
come from root crowns
not killed by the fire.

Many annuals and
herbaceous perennials

57a *Carex*

prostrate, aromatic,
flowers whitish.
flowers white

flowers blue,
involucres pearly.
flowers bright yellow.

flowers pinkish white.

flowers purplish blue.

July 31 - 7.5 km. s. of
Valbonne, 10 km. w.n.w. of
Antibes

pine forest with sparse
under-story of oaks;
flat ground.

35964 *Centaurium*
occasional along path

65 *Linum*
occasional

66 *Quercus pubescens*
common

67 *Linaria*

This forest has
a rich ground flora
and considerable *Pteridium*.

The trees are 10-15 m. tall,
~~up~~ up to 25 cm. diam.

mixture of *P. pinaster* & *P. halepensis*

In this region the pines
are mostly cut for
pulp-wood and not
allowed to reach much
over 10 m. tall and 10-15 cm.
diam.

200 - 230 m.

flowers yellow.

shrub 2 m. tall.

3 km. e. of Valbonne is
a dense maquis of
Calycotome spinosa
Cistus monspeliensis
Cistus alba
Phillyrea angustifolia,
Myrtus communis,
Pistacia lentiscus
Quercus ilex
a little *Q. pubescens*.

this scrub is 2-3 m. tall,
and is in a sparse
~~for~~ stand of
Pinus halepensis 10-15
m. tall, 10-20 cm. diam.

July 31 - near Biot,
7 km. n. of Antibes,
wasteland of a
volcanic conglomerate
of a basic character,
with very sparse shrub
vegetation, many annuals.

35968

grass

2 69

Diplazium serotinum

rare

1 70

*Juncus pygmaeus*common in ^{small} desiccated
pools on rock surface.

1 71

Crucianella

rare among rocks

1 72

Sedum rubens

common among rocks

1 73

*Asplenium Trichomanes*occasional in shaded
rock crevices.

1 74

common in rock crevices

1 75

Polypodium serratum

occasional in rock crevices

1 76

Gymnogramme

occasional in rock crevices

2 77

Ceterach officinarum L.

common in rock crevices

1 78

*Paronychia*rare in ~~rock crevices~~

small desiccating pools

2 79

*Helaginella*common on shaded rock
faces and ledges

30

Plantago

desiccating rock pools

sheet
base [8a] + 7b au
10.000

IGN

Aspres 40-70

Trayas Var 50-100

Cannes XXXVI-44

50,000

dried completely at this
season.

dried completely at this
season.

curled up in dry weather.

completely dry at this
season.

prostrate, closely adherent
to rock, mostly completely
dry at this season.
completely dry at this season.

sheet
grasse 8a + .7 b an
10.000+

IGN

les Aspres 40-70

le Trayas Van 50-100

Cannes XXXVI-44

50,000

July 31 - near Biot,
7 km. n. of Antibes,
wasteland of a
volcanic conglomerate
of a basic character,
with very sparse shrub
vegetation, many annuals.

35968

grass

2 69

Diplazium serotinum

rare

1 70

*Juncus pygmaeus*common in ^{small} desiccated
pools on rock surface.

1 71

Crucianella

rare among rocks

1 72

Sedum rubens

common among rocks

1 73

*Asplenium trichomanes*occasional in shaded
rock crevices.

1 74

common in rock crevices

1 75

Polypodium serratum

occasional in rock crevices

1 76

Gymnogramme

occasional in rock crevices

2 77

Ceterach officinarum L.

common in rock crevices

1 78

*Paronychia*rare in ~~rock crevices~~

small desiccating pools

2 79

Helaginella

common on shaded rock

faces and ledges

30

Plantago

desiccating rock pools

40-70 maps

stiff.

dried completely at this season.

dried completely at this season.

dried completely at this season.

dried completely at this season.

dried completely at this
season.dried completely at this
season.

curled up in dry weather.

completely dry at this
season.prostrate, closely adherent
to rock, mostly completely
dry at this season.
completely dry at this season.

July 31 - Biot - exposure of basic volcanic conglomerate with labradorite. Soil pH tested by Guinochet is 9.0. Mass of boulders up to several dm. diameter in a consolidated but rather crumbly matrix.

This formation covers about 30 sq. km. (or 30 km. sq.!) and has very little soil. Its vegetation presents the aspect of a desert.

The vegetation is sparse, only $\frac{1}{4}$ to $\frac{1}{2}$ of the ground is actually covered by the woody vegetation. This is a very sparse scrub with *Cistus monspeliensis* the most abundant species, up to 1 m. tall, with some *Lavandula stoechas*, and with scattered *Pinus halepensis*. The vegetative period is from December to April, during which time water actually runs over the ground and stands in shallow pools. Ephemeral annuals are present in large numbers

and, with mosses cover much of the bare ground and the beds of the desiccating pools. An *Isotria* is found in the desiccating pools.

These observations were made on a moderate west slope, over which an old Roman road went whose wheel-tracks are still apparent, in places 10-20 dm. deep. In these wheel tracks are tiny annuals and dormant perennials, incl. the *Isotria*, *Plantago pusilla*, and *Juncus pygmaea*.

~~The ravines are~~
The east slopes, and especially the ravines, have more trees in them. On the rocky walls of the ravines are several xerophytic ferns, ~~an annual~~ including *Ceterach*, an annual *Sedum* of which only the hard dry inflorescence remains, *Umbilicus pandalinus*, of which only the dry fruiting spikes remain, *Selaginella*, etc.

164

165

Aug. 1 - hills e. of Nice are pine-covered.

Beyond Nice is Cap Ferret, generally pine covered but mostly occupied by houses, etc.

East of Beaulieu ^{sur Mer} are high bluffs and cliffs of light gray rock, prob. limestone, the tops of the bluffs with scattered pine, the cliffs with almost no vegetation. At the base little wild vegetation, but, semi-wild, are numerous *Agave americana*, many of them flowering, also a very large *Opuntia* prob. *imbecilis*, and cultivated plants of a generally subtropical character (*Bougainvillea*, *Nerium*, *Phoenix canariensis*, etc.) which contrast strongly with the pines which are most abundant and, with *Olea*, form the tree background.

Drive through Monaco and Monte Carlo. Many *Ficus carica*, *Cupressus sempervirens*, etc. Some *Eucalyptus*, *Acacia* spp.,

Quercus ilex, *Arundo*, etc. Pines seem to be mostly *P. halepensis*.

East of here, at Cap Martin some semi-wild thickets with oaks, etc. some pine. *Schinus molle*. Menton - mts. behind it are wooded below, very sparsely vegetated above.

Lowlands rather green and luxuriant with *Ficus*, *Olea*, *Phoenix canariensis*, *Schinus*, *Arundo*, *Araucaria excelsa*, *Cupressus*, and gardens of all sorts. *Citrus*, *Eriobotrya*, *Platanus*, *Bougainvillea*, *Washingtonia*, *Cratogeomys*, *Acacia* spp., *Magnolia grandiflora*, *Arecastrum*, various other palms, etc.

Dry aspect continues to Genoa, with in places more or less trees on the high slope.

From Genoa east along the coast the cultivated and semi-wild vegetation is much more luxuriant, with many pines, *Pinus*, *Cupressus*, *Fraxinus* and many other trees,

of Aug. 1 - Dry looking hills, almost completely terraced, partly with olive groves, vineyards, etc. bet. Portofino and Ventimiglia. Cliffs and high bluffs above V. olive groves in parts not too steep. Stony river-flats with pioneer vegetation.

Eastward, coastal slopes are terraced and have rows of grape vines and some fig trees, but prevailing tone of landscape is determined by olive trees. Some pines but even these have a gray tone.

Lowest few yards above water, where not cultivated, have agave, and much *Arundo donax*, as well as *Atriplex halimus* and many other halophytes. Where there are shrubs they are low, compact, and rounded, due probably to spray shearing. Some attempt to plant pines here behind shelter. The most common cultivation is carnation-culture, at least n. of S. Lorenzo Cipressa.

Railroad is only a few feet above sea-level.

East of Imperia / Neglia the terracing of the hills become less marked. Olives still dominate the lower slopes.

Near Andora the hills are ^{even} more rocky and are covered by a rather sparse scrub down to a rather low level.

Here the r.r. leaves the sea for a very short distance.

Eastward at least the lower slopes of the hills are ~~less~~ terraced and cultivated. Locally there are wide flat valley mouths, intensively inhabited and cultivated.

Seldom is there a square meter of ground flat enough to cultivate that is not cultivated.

The coastal strip, seaward of the r.r., if more than a few yards wide, is mostly occupied by houses and gardens, many fruit trees, oranges, peaches, figs, etc. For considerable distances, where the land is very

low and would be covered by storm waves, there is a substantial concrete wall 1.5 m. high at the top of the beach and the several yards of flat ground behind it is in gardens.

Olive groves on most lower slopes except where too rocky.

Same pattern generally eastward. Pines become fewer. ~~Higher~~ ~~the~~ higher and rockier parts of the coastal mountains are entirely bushy. Lower, among the olive groves, are occasional small groups of umbrella shaped Pinus pines. On bluffs above sea are patches of Erica scrub - bushes not touching.

Around Savona the higher hills are wooded with pine.

Dry aspect continues to Genoa, with, in places, more or less trees on the high slopes.

From Genoa east along the coast the cultivated and semi-wild vegetation is much more luxuriant

with, among the dominant olives, many pines, esp. P. pinea, cypress, palms, and many other trees, even Robinia. The low strip along the coast is almost entirely villas, etc. To Uscita. Olive groves ~~reach~~ reach half-way or more to the tops of the hills surrounding Uscita. Above them are pine woods.

East of this around Rapallo, the same pattern continues, with in places olives to the tops of the hills, locally pines down fairly low.

Same pattern continues ~~southward~~ ~~eastward~~ along southeastward along the coast, with pines in steep places coming even down to the sea-cliffs. Levanto. Much terracing, with terrace surfaces at about a 30-45° slope.

Left sea at La Spezia

Hills inland wooded. Lower slopes with olive groves. Mountains in distance very rugged, upper parts bare and rocky.

Vegetation in thickly settled valley luxuriant - olives, fruit trees, almonds, grapes, poplars.

Woods in patches on lower slopes of hill are deciduous. Pines no longer important in valley around Carrara. Upper slopes densely wooded.

Broad flat valley, mostly intensively cultivated with a close mixture of gardens, rows of grapes and fruit trees. Occasional fields. Many of grapes on high wires. Olives abundant. Densely populated. Some of lower slopes of hills grazed, but mostly covered by olives.

Mountain slopes above Carrara - Avenza sparsely bushy but badly scarred by marble quarries and their debris cones.

RR several km. from sea on flat plain. Higher mountain tops bare.

Beyond Massa hills are covered by pine forests except for cleared and terraced parts.

Then in lowlands *Populus alba* and *Salix* begin to dominate landscape. Grape vines on trellises. Then the poplar changes to a green one. Lower slopes with olive groves.

Trees - fruit, willow, poplar, olive completely dominate landscape on all of this coastal plain. somewhat more open toward Viareggio, but only locally.

South of here vineyards become more important on flat land. Then a large forest of *Pinus pinea* presenting a very odd appearance with flat crowns, scattered under story of oaks and ground layer of heather and *Pteridium*, density of this layer varying considerably.

Then some open fields and meadows with a few long rows of trees.

Then the fields become more subdivided and lined with rows of willows and a single row of grapes around each field.

Then more open country but with cultivation in rather small plots separated by ditches but now hedges and trees only along roads.

Pisa. Area V. generally more cultivation, small plots separated by rows of olive vines. Hills to north densely wooded.

Same pattern eastward. Rolling hills along south side of valley are cultivated but steeper slopes are either in small woods or terraced.

Aug. 5 - Florence To Milan

Flat valley with mostly olive groves and vineyards, some misc. cult. Grapes trellised up on high wires or even climbing in trees.

On east a high range of hills or mts. olive groves running up on lower gentler slopes, green scrub or scrub forest with uneven stand of pine ^{or other conifer} on slopes above, with some patches of sparse scrub. High ~~summits~~ summits with sparse scrub or grassy. Very rocky. Prato. Some citrus and figs with olives, grainy between. R.R. lined with Robinia thickets, some dillanthus. Beyond Prato m. enters smaller side valley between similar rocky hills with scattered pine or Cupressus.

Vaiano. Above this, flat narrow valley bottom has olives + grapes, a few other fruit trees, some poplars + willows and grounds along stream. Pine forests, and some broad-leaf forest - oak and chestnut on slopes. In place terraces and olive groves run far up hills. Robinia thickets along roads and railroad.

After a series of long tunnels, it merges into a valley with rather gently sloping sides, the greater part of which, on s. side, are cultivated. Some woods on steeper or higher points, seems to be mainly meadows, some vineyards.

Then enter a part of valley with steep sandstone sides, these wooded except for small patches of cultivation. Woods scrubby. Montyuno-Vado.

More tunnels. Then a broader valley with gentle open cultivated slopes on both sides.

Mostly grain fields and meadow. Flat valley bottom with fruit trees, ~~or~~ grapes, alfalfa. Rows of poplar. Some vineyards on lower slopes. Miss. cult. between rows of grapes and trees on valley floor. Apparently no olive trees. Approaching Bologna.

Bologna is in flat country surrounded by very low hills. Fruit trees abundant.

North of Bologna is a broad flat plain, all under intensive cultivation. Small fields of alfalfa, maize, separated by rows of trees - elm & poplar, mostly with grapes climbing in them. Willows along ditches and in wet places. a few crataegus hedgerows. Fruit trees locally. Locally, also, the rows of trees are absent between fields, and appearance is of larger open fields, but cult. is still in small patches.

Some vineyards, some tomatoes, beets, millet?, ^{sage} other vegetables in addition to dominant alfalfa and maize. Small orchards. Where grapes are not with trees, they are up on ~~wires~~ wires 1.5 - 2 m. tall. Much bare plowed ground.

Landscape is tree-dominated but actually mostly open ground. Modena.

This pattern ~~is~~ does not vary much for a long distance except for one or two broad flat stony river-beds with little or no water. Irregular strips of bushy willows along banks.

Much of this land is irrigated by pumpish water from wells.

Locally tomatoes and maize are grown together. Seems to have an inhibiting effect on the maize, as the plants are relatively small.

Parma. Riverbed dry, weedy. Stretches of Robinia along r. generally, but not everywhere!

near Fidenza the general aspect becomes somewhat more open, with larger fields, not so often separated by rows of trees and grapes, but some hedgerows, more rows of cherry or peach trees. Some fair sized tracts with no trees. Trees do not completely dominate landscape.

Misc. cult. tomatoes, maize, tobacco, alfalfa, etc. Irrigated from wells. Almost no ~~grapes~~.

Riverbeds dry.

Cadeo. More poplars.

few grapes.

Piacenza. Large river with broad bed and considerable water. Willows along banks but not many.

Large fields and groups of fields separated by rows of poplars. Some fruit trees. Misc. cult. alfalfa, maize, few grapes. Some small patches of poplars. Some willows.

Mulberries for silkworms.

Poplars dominate landscape.

Secugnago. Lodi.

Irrigation from canals, all way to Milan. Country gets more open approaching Milan.

Milan northward -

Flat land - misc. cult.

maize and alfalfa principally. Dense population. Some fruit trees. Some poplars. Robinia abundant along r. and roadsides.

Cannago L.

Flat valley with meadows, low wooded escarpments on sides, cut in flat country. Woods on walls entirely of Robinia thicket.

This ravine winds into somewhat rougher country. Robinia thickets up to 10 m. tall.

Approaches foot of Alps. - must be cut in a great alluvial fan.

Albate-Camerlata - almost at foot of mts.

Mts. wooded but with much terracing even on very steep high slopes. Robinia very abundant around Como, Ailanthus also.

Lake Como surrounded by steep mountains with woods, but with scattered houses clear to tops. A promenade from Como up to a thickly built up hill-top above.

Chiasso - surrounded by wooded hills, with a few scattered houses and clearings. Flat valley bottom with misc. cult. scattered groups of poplar and willows. Woods on hills deciduous. Those on low hills largely Robinia thickets, more mixed upward.

Talus at base of high cliffs sparsely wooded. Cliffs with much bare white rock. Upper part of valley mostly in meadow, some cult. Irrigated.

Lake Lugano surrounded by steep, densely wooded slopes. Narrow flat land on n.e. side, with meadow and houses. Very little on other side.

Maroggia - Melano.

Dense deciduous woods on all steep slopes. Seem to be largely chestnut.

Lugano.

Vineyards on lower slope on east side of valley above lake, valley of R. Ticino. Upper and steep lower slopes

densely wooded - mostly broad-leaf trees, some conifers on and around summits. Valley winds between steep slopes, quite narrow, a few meadows in bottom, small vineyards ~~at foot~~ on slopes. ~~some~~ ~~thicket~~ ~~is~~ along rr. mostly Robinia.

On the high slopes, where there is a bit of moderate slope there is a clearing usually with a house.

Vineyards still on lowest slopes near

Rivera Bianca

Tunnel to Lago Maggiore broad plain above the lake all in green farms, mostly meadow, ~~for~~ rather few trees, scattered houses.

Steep slope round this valley mostly wooded, Castanea and Robinia, but any possibly cultivable slope cleared. Lowest ones in grapes.

This plain winds for some distance to Cubiasco.

Grapes up on high vines, 1-2 m. or even more. Same to Bellinzona. Here valley narrows. Slopes are

rocky and wooded, still with chestnuts and other broadleaf trees. Grapes and meadows in valley bottom. High summits very steep and bare. General slope here 45° or more, some of them steeper at bottom.

Above this, below Isogna-pines appear both on valley floor and on summits.

Valley walls get steeper and much rockier, enormous bluffs and cliffs, woods scrubby and sparse, thick ^{scrub} on talus.

Biasea. Great cliffs on east side. Still grapes, on trellises, in valley bottom, otherwise meadows. Snow patches visible on high peaks. Above this valley becomes a tremendous gorge a few hundred m. wide, with towering peaks and cliffs with hanging valleys on both sides. Sloping flanks scrub-covered with scattered trees, cliffs bare & nearly so. High slopes covered by coniferous forest, prob. spruce. Around Giornico the valley

bottom, a bit wider, is covered by vineyards, entirely on trellises. Slopes above here with beech, ~~and~~ birch, and spruce(?) woods.

Lavorgo. Conifers and birches except on talus at bottom which has a broad leaf scrub. Valley bottom with willow-birch thickets and meadows.

Magnificent Picea on bluffs, also Larix.

Soon they clothe everything except cliffs and valley floor. Some ~~best~~ admixture of birch.

Then no significant meadow area in valley floor. Gorge very narrow.

Rodi-Fiesso. - valley slightly wider, meadow runs up slope a little. One side has spruce forest, showing conspicuous avalanche scars. Other side some spruce, large areas of pure birch, some high meadows.

Ambripiotta

Some Sorbus in lower forests.

Valley widens out and meadows become more extensive both in valley bottom and on slopes. High peaks around are bare rock with patches of snow. Ariolo. Wide valley, surrounded by very sharp high peaks.

Rt. Gothard Tunnel 12 minutes \pm , to Goerchenen. Here, high practically bare rock cliffs. Some patches of spruce forest. Snow patches everywhere. Glacier at head of valley. Lower talus cleared, higher with spruce forest. Highest slopes in meadow and low scrub. Peaks above this bare rock.

Avalanche scars are sharp clear stripes running down through spruce, grassy or with very low scrub. Steep mountain torrents in vertical ravines with debris cones at bottom. This grass covered.

Aug. 7 - Fribourg - Geneva

Predominantly hay meadows with some grain fields. Many patches of forest, this either beech, spruce, or mixed beech, fir and spruce in varying proportions. Fruit trees around houses. Alnus and Salix along streams. Some Robinia along rr. but not much. A few birches along fences and in the occasional hedgerows.

Some vegetable gardens. Agriculture generally in small plots. Alfalfa common, some Onobrychis.

Gently hilly country. Perhaps 5% in woods. Everything except the grain is very green. Grain is being harvested.

Romont.

Some oaks in hedgerows, and in edges of forest patches. Vauderens - edge of a lower level of rolling country with the Jura in the distance. This level must be at least 10-15% wooded, or even more. Spruce predominates. Otherwise same general pattern.

The beeches here seem to have abnormally small leaves in the upper parts of their crowns, normal in lower parts. This observed more or less throughout trip.

Palézieux. Near here some Abies and some Picea observed in forest - mostly on steep slopes and ravine sides. Also some *Larbus aucuparia*.

Quite a few walnut trees scattered around in fields, and esp. in hedge-rows, near Puidoux and Lake Geneva.

Lower slopes above Lake Geneva are in vineyards - the vines mostly staked but not on wires. Some orchards. Thickets in ravines.

Lausanne.

Hilly ^{or rolling} country, partly vineyard, partly misc. cult. partly woods, extends some distance back from lake. Lonay. Thickly populated. Gardens of all sorts. Fruit trees. Ornamental Orchards.

Toward Geneva this rolling country narrows and becomes much flatter. The hills back of it are mostly wooded except the lower slopes. The flats are mostly cult. with beehives, no hedgerows, fewer orchards, many vineyards and grain fields. Fewer patches of woods.

Widens again. Jura in distance. Densely wooded.

Nyon.

Woods here have few conifers. Mostly beech. Some oak. A few spruce + pines.

Houses become more numerous again.

Versois.

Thickets and rows of trees, as well as orchards numerous. Trees dominate landscape. Robinia abundant.

Aug.

July 6 - Engstlensee, Canton Bern
meadow with scattered trees

35931

*Pinus cembra*1 ~~8~~scattered trees, with *Larix*,
said to be remnants of former forest.

1 37

Pinus cembra

same

Aug.

between
July 6 - Engstlensee and
Jochpass, Canton Bern
meadow patches on rocky banks

1 83

Primula

rare

1 84

Tofieldia

occasional

1 85

Soldanella

locally common

~~July 6 - Engstlen, Canton Bern~~

86

~~*Tofieldia*~~

common in

Aug.
July 6 Tannenalp, Canton Unterwalden
turfy slope, common

1 86

Tofieldia

Aug. east of

July 6 Melchsee, Unterwalden
boggy place in grazed meadow.

1 87

Plantago alpina

common

1 88

Lycopodium selago

1 89

Lycopodium (or *Selaginella*)

1 90

Nardus strictus

common locally

1 91

Trichophora?

common

1850 m.

tree 10 m. tall.

tree 14 m. tall; staminate
cones bright red.

2000 m.

flowers crimson

flowers greenish; leaves
in one plane.

flowers rose-purple

1910 m.

leaves in one plane, buds only.

1990 m.

said to be good cattle food.

- creeping, spikes erect.
unpalatable to cattle

tufted

Aug.

July 6 - Engstlensee, Canton Bern

35992

Asplenium viride

occasional in rock crevices

Aug.

July 6 - Valleys of Melchaa and Melchthal above Larnen - meadows with patches of woods, the steeper slopes almost completely wooded, with beech-fir woods - mostly *Fagus* with some *Abies* and *Picea*. This is the basic vegetation type at lower altitudes in this part of the country. Above this, from perhaps 1000 to 1800 m. or a little higher, is *Picea* forest, and above it was formerly *Pinus cembra-larix* forest, now mostly replaced by meadow or pasture. Above this, perhaps above 2000 m., alpine meadow.

In the higher parts of the *Fagus-Abies* belt *Acer pseudo-platanus* and *Picea abies* are common, as well as *Fraxinus*.

The meadows that now occupy the place of the former *Pinus cembra-larix* belt have a mixture of the plants that grew under these trees with those of the

rachis of frond green.

meadows above. The former existence of the *Pinus* and *Larix* is determined by the persistence of herbaceous species characteristic of their ground layer, and of scattered remnants of the forest. These meadows have been heavily grazed for a long time and have assumed a low compact turf-like character, the vegetation not usually more than 10 cm. tall.

This is the common type around the Melchsee at about 1900 m. on calcareous rock. This limestone shows conspicuous lapies or erosion channels, which shelter many interesting plants. This area is completely bare of trees and all shrubs except prostrate ones such as *Salix retusa*, *Juniperus communis* and *Rhododendron hirsutum*. There are many herbs characteristic of the "tall meadow" and ~~also~~

some from above timberline.

The annual precipitation here is about 2000 mm.

This type of meadow continues through the Tannenalb and around Tannensee. Around both Melchsee and Tannsee are zoned marshes and boggy ground. In low spots in the valley are boggy or marshy spots with some species different from those of the ~~dry~~ drier meadows. Locally, also, are areas of *Nardus strictus*, which is stiff and harsh and which is so disliked by the cattle that when they accidentally bite off a tuft of it they spit it out. Dry tufts of *Nardus* are common in places. It seems that both *Nardus* and a big yellow *Ranunculus* have been greatly favored by grazing.

Over the line in Bern Canton there is a steep slope which has been protected from grazing. It has "tall meadow" vegetation up to 3-4 dm. tall or more, with many showy flowers,

such as *Rhinanthus*, *Dianthus*, *Anthriscus*, *Lotus*, *Delphinium*, etc. Very rich in herbaceous species. Here are patches of *Picea* and occasional trees of *Pinus cembra*.

Around Engstlensee is a grazed meadow with commonly scattered *Picea*, individuals and patches, with some *Pinus cembra* and *larix*. The general background here is grass with many herbs, and with shrubs such as *Rhododendron*, *Daphne mezereum*, *Vaccinium myrtillus*, *V. uliginosum*, and *Calluna*. This extends up to Jochpass, but the trees drop out not far above the lake.

On the north slope of Jochpass are rocky hills covered by meadows with *Ranunculus*, *Myosotis*, *Chrysanthemum*, *Cirsium oleraceum*, *Gentiana verna*, *Dryas octopetala*, *Athyrium*, etc. with patches of *Vaccinium* heath.

Know patches.

On the slope across the valley of Engelberg timber line is clearly visible at perhaps 2000 m. well below the scree slopes and cliffs. Below it is steep meadow with patches of spruce.

These mountains are all limestone.



